THE UNIVERSITY OF ALBERTA

AN ATTRIBUTIONAL ANALYSIS OF PERFORMANCE OUTCOMES AND THE ALLEVIATION OF LEARNED HELPLESSNESS ON MOTOR PERFORMANCE TASKS: A COMPARATIVE STUDY OF EDUCABLE MENTALLY RETARDED AND NON-RETARDED BOYS

by

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A THESIS

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ABSTRACT

The primary objective of this study was to test and compare the effectiveness of attribution retraining and performance-based strategy training programmes which were designed to assist educable mentally retarded and non-retarded boys to overcome failure at motor performance tasks. The study was formulated into a sequence of experiments, with the direction and design of each being determined according to the results of the preceding experiment.

The first experiment was designed to assess the influence of the locus of control construct, a personality variable, as a determining factor in the motor performance of educable mentally retarded boys responding to success and failure conditions. As the predicted differences between the internal and external locus of control groups was not substantiated this construct was deleted as a blocking variable in the subsequent experiments and a mental and chronological age matched design was used.

Using a pursuit rotor as the motor task, the second experiment focussed upon the attribution of student achievement-related behaviour as a function of performance outcomes. The purpose was to establish whether the attribution model of achievement motivation could be effectively applied in understanding the causal perceptions of both non-retarded and educable mentally retarded boys under conditions of simulated success and failure. Utilizing an attribution box, specifically designed for this study, the ability of the selected groups to make differential causal ascriptions was confirmed. Further, a

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significant finding was the manner in which the educable mentally retarded groups most often attributed failure outcomes to a lack of ability and success to good luck and personal effort; a behavioural response which is characteristic of low achieving groups. By contrast, the non-retarded subjects responded in a manner consistent with high achievers. The results of this experiment would appear to make a unique and important contribution to the understanding of attributions made by mentally retarded children and could be of assistance in future studies linking attribution theory and learned helplessness.

The third experiment compared and assessed the effectiveness of an attribution retraining programme and a performance-based strategy training programme in alleviating induced learned helplessness in non-retarded and retarded boys on a motor performance task. From the results, it was evident that both training methods alleviated the condition of learned helplessness and significantly improved the performance of the educable mentally retarded group. The two training conditions were also found to be effective in improving the performance of the two non-retarded groups.

The study has explored the potential of two methods of assisting individuals in coping with failure situations. Applications of the finding to the teaching situation were suggested, together with implications for further research.

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Chapter I

INTRODUCTION

In most discussions comparing the performance characteristics of normal and educable mentally retarded groups matched on mental age, the observed differences have been largely attributed to existing motivational and emotional differences. On the whole these discrepancies are the outcome of the differences in the life histories of the children. Whereas the normal child has experienced success and received positive reinforcement, the retarded child has been frequently subjected to prolonged failure experiences. Considerable interest has been generated to investigate the motivational influence that these success and failure experiences have on performance outcomes.

The majority of studies dealing with the effects of success and failure on the motor performance of mentally retarded and normal children have yielded conflicting results because of the variations in the nature of the samples studied, and the methodological techniques used. Butterfield and Zigler (1965:26) indicated that the inconsistencies may be caused by:

> (a) the methods of inducing success and failure experiences, i.e., experimentally manipulating the amount of objective success and failure experienced and/or having the experimenter tell the child he is doing well or poorly; (b) the degree of success and failure involved in experimental manipulations; (c) the degree of similarity between the tasks upon which the subject received success or failure and the criterion measure; (d) the criterion measures themselves.

A number of models have been proposed to account for skilled perceptual-motor performance. These models include descriptions of

the following component processes that facilitate optimal performance: sensory output, attentional processing, perceptual coding, decision making, response selection, initiation and execution, and the feedback systems associated with them. Wall (1978:81) has cited many of the comparative studies which have indicated that the mentally retarded are deficient in a number of component processes important to human motor performance. However, there is no research evidence to indicate that the motivational level of the subjects may account for some of the differences which occur in the motor performance of mentally retarded and non-retarded children. Zigler (1967:7) in summarizing the various reasons for differing performances between these two groups, stated:

> . . . performance on experimental and real-life tasks is never the single inexorable product of the retardates' cognitive structure, but rather reflects a wide variety of relatively non-intellectual factors which greatly influence the general adequacy of performance. Thus many of the reported behavioral differences between the normal and retardates of the same mental age are seen as a product of motivation and experiential differences between these groups, rather than as a result of any inherent cognitive deficiency in the retardates. Factors thought to be of particular importance in the behavior of the retardates are social deprivation and positive and negative reaction tendencies to which such deprivations give rise: the higher the number of failure experiences and the particular approach to the problem solving which they generate. . . .

As a followup to Zigler's original observations it may be profitable to develop a conceptual model that will permit the investigation of motivational developments in retarded children.

In an attempt to resolve these inconsistencies research over the last decade has been directed towards investigating causality factors associated with performance outcomes. The attributional model proposed by Weiner, Frieze, Kukla, Reed, Rest and Rosenbaum (1971) has become the most popular method of classifying the causes

of success and failure. In this model the four perceived causality factors (ability, effort, task difficulty and luck) are comprised within two causal dimensions; locus of control (internal and external) and stability (fixed and variable).

Research investigating the ability of mentally retarded subjects to make causal ascriptions for performance outcomes has been limited. Recent studies by Hoffman and Weiner (1978), and Horai and Guarnaccia (1975) have indicated that potential benefits may result from utilization of the attribution model. Using educable mentally retarded adult subjects, Horai and Guarnaccia noted that the subjects were able to make causal ascriptions to ability, effort, task difficulty and luck as a function of success and failure feedback. The retarded subjects attributed failure to lack of effort and bad luck, and ascribed success to ability. Although this study did not offer a ready explanation for these findings, it did demonstrate that retarded adult subjects were able to make causal ascriptions for outcomes when given success and failure feedback. The more recent study by Hoffman and Weiner (1978), supported the findings by demonstrating that retarded individuals respond to causal ascriptions in a manner similar to normal subjects. The study further indicated that attributions of ability for success enhanced performance, suggesting that the retarded individuals have the capacity to identify locus of control and stability dimensions, and that the cognitive recognition of these dimensions are important determinants of their ascriptions. It was purported by the authors that their findings would be of great assistance in developing programmes designed to facilitate learning and enhance the affective state of the retarded

persons.

The most recent line of enquiry into the effects of success and failure has utilized the concept of learned helplessness. This concept refers to a phenomenon by which an individual learns over a series of trials that he/she has no control over the outcome of events. The theory was developed by Seligman (1967, 1973), and has been elaborated with research evidence by Seligman and his colleagues, (Hiroto and Seligman, 1975; Maier and Seligman, 1976). Studies utilizing the attribution theory have attempted to identify the attributed causal factors associated with helplessness in an endeavour to motivate individuals experiencing difficulties as a result of failure (Andrews and Debus, 1978; Dweck, 1975; Hiroto, 1974). Recent research has monitored behaviour following successive failures caused by uncontrollable factors. The following comprehensive summary of empirical research that has linked helplessness to observable cognitive and behavioural effects has been provided by Weisz (1979:311):

> These effects include (a) attributions of failure to stable, uncontrollable factors (Abramson, Seligman, and Teasdale, 1978; Diener and Dweck, 1978; Dweck and Goetz, 1978); (b) deficits in perseverance following failure (Dweck, 1975; Dweck and Bush, 1976); and (c) deficits in voluntary-response initiation (Maier and Seligman, 1976; Miller, Seligman and Kurlander, 1975).

From the conclusions of the research cited, two factors underlying these helpless behaviours have emerged: a perception of lack of control over situational outcomes, and failure attributed to lack of ability.

It has been purported that mentally retarded children are particularly susceptible to helplessness because of their frequent exposure to failure (Cromwell, 1963; Zigler, 1971) and the negative feedback they often receive from society in general. There is little doubt that these failure experiences may cause these children to

attribute their failures to deficient ability. Although learned helplessness has become a central issue for many research projects, it is only in recent years that studies utilizing this concept with mentally retarded children have been undertaken. This research has been initiated by Raber and Weisz (1978) using teacher-to-child feedback in matched reading groups of retarded and normal children and Weisz (1979) using a series of multiple measures to demonstrate that learned helplessness characteristics are definitely present in mentally retarded children. Results coincide with the view that retarded children learn helplessness over years of development by successive failures and helplessness inducing feedback.

The previous research has failed to positively identify the variables influencing the different reactions made by educable mentally retarded children following success and failure. Recent studies using non-retarded subjects have utilized the locus of control personality variable in endeavouring to account for variations in motor performance (Martens, 1971). There was no evidence however, of any research being undertaken utilizing this approach with educable mentally retarded children. It was hoped that by performing a series of three experiments involving the theoretical framework of attribution theory, personality variables influencing educable mentally retarded and non-retarded children's reactions to success and failure experiences might be identified. The experiments proposed in this study have therefore been designed with three basic purposes in mind. The first purpose was to determine whether the locus of control variable is the determining factor causing different reactions in children following success and failure. The second purpose of the study was to

identify the causality attributions that the educable mentally retarded and non-retarded boys make for these outcomes. Finally, the experimenter endeavoured to establish an attribution retraining programme designed to assist these children in their confrontation with failure experiences.

Considerable attention has been given in the literature to the selection of the intelligence groups in normal-retardate comparative studies. Since chronological age (CA) is primary to the concept of mental retardation, Ellis (1969) argued that a CA match was theoretically meaningful. Zigler (1969) subscribed to the view that retardates should be compared to their mental age (MA) matched peers. Denny (1964) recommended a three group design consisting of retardates, MA matched and CA matched normals. This is the design that was followed in the second and third experiments of the study. It was felt that this design would enable the researcher to determine the effects of these organismic variables more thoroughly. Although numerous studies have been performed to investigate the motivational effects of success and failure on cognitive tasks, the potential of utilizing the attributional model of achievement motivation for improving the motor performance and initiating the attributional retraining programmes, specifically with educable mentally retarded children is yet to be realized. The primary concern of the study was therefore to devise appropriate techniques for facilitating the motivational level and hence the improvement of motor performance of educable mentally retarded children.

In summary, the purpose of this research was to obtain information on the following questions:

1. Do success or failure experiences differentially influence the motor performance of educable mentally retarded boys classified as internally or externally controlled, on the locus of control scale?

2. Do educable mentally retarded boys make causal ascriptions as a function of success and failure feedback in a manner that is similar to the non-retarded boys of the same mental age?

3. Do educable mentally retarded boys make causal ascriptions as a function of success and failure feedback in a manner that is similar to non-retarded boys of the same chronological age?

4. Does the motor performance of educable mentally retarded and non-retarded boys, matched on mental and chronological age, improve significantly following either attribution retraining or a strategy training programme designed to alleviate learned helplessness?

Chapter II

REVIEW OF RELATED LITERATURE AND RESEARCH

The review of related literature is divided into three main areas. The first gives a historical overview, tracing the origin and development of attribution research by three major theorists. The second provides a review of research which has utilized an attributional analysis in endeavouring to establish the causality factors associated with the success and failure outcomes in achievement related performances. The final area examines the concept of learned helplessness and reviews recent developments where attribution theory has been instrumental in furthering the understanding of the learned helplessness phenomena. This section also includes the theoretical background and recent research evidence which associates the concepts of mental retardation and learned helplessness.

Development of Attribution Theory

Understanding and interpreting the various actions of the individual has become a very important aspect of our social environment. In our everyday lives we are not dispassionate observers of human behaviour, watching without evaluation. On the contrary, we try to understand behaviour to interpret it and to explain it, to determine what it means for us and to make value judgements about it. In the area of social psychology the process by which such inferences

and descriptions are made is known as attribution theory.

Attribution theory, which is described as a cognitive approach to the understanding of behaviour, was not originally formulated as a theory of individual motivation. It is in part a theory of how people perceive motivation, "how a typical observer infers a person's motivation from his actions" (Kelley, 1967:193). Attribution concepts are most important when perceivers try to identify the behaviour they are observing. If the first goal of attribution is to increase the perceivers' understanding of the world around them, the second objective of dispositional attribution is to increase their ability to predict what future actions may occur. Kelley (1967:163) described attribution theory as "the process by which an individual interprets events as being caused by a particular part of a relatively stable environment." In endeavouring to construct a systematic framework and synthesize the segments of the process by which the causal schemata occurs, Jones, Kanhouse, Kelley, Nisbett, Valins and Weiner (1972:x) concluded that:

> Attribution theory grows out of a number of converging lines of inquiry in social psychology. The research along these lines can be roughly classified according to emphasis on certain broad concerns:
> (1) the factors motivating the individual to obtain causally relevant information,
> (2) the factors determining what cause will be assigned for a given event, and
> (3) the consequences of making one causal attribution rather than another.

Festinger's (1954) analysis of the role of social comparison processes has been a major source of literature for research on motivational factors. Fritz Heider (1944, 1958) initiated the line of inquiry concerned with determining the causal factors associated with a particular outcome. The third type of research in this area has focused

on the consequence of the causal attributions, and this direction of research has linked attribution theory and cognitive dissonance together (Brehm and Cohen, 1962; Aronson, 1969).

Attribution Processes

Fritz Heider is generally acknowledged to be the founder of attribution theory even though he considers his work to be "an investigation of common-sense psychology" (1958:9). It was in his early paper on phenomenal causality (1944) that an interest in the attribution of causality was expressed. The language that he employed and many of the basic concepts in attribution theory are taken from the common vernacular. He states his goal as being "the classification of some of the basic concepts that are most frequently encountered in an analysis of naive descriptions of behavior" (1958:14). It was the comprehensive work of Heider which began the systematic study of how laymen attempt to understand the intricate process of behaviour. This work reflects Heider's background and training in the Gestalt traditions of psychology. The Gestaltists emphasized the importance of describing the perceiver's subjective experience, rather than concentrating exclusively on objective description of stimulus input and observable behavioural output. Accordingly, they maintain that both ourselves and other people have an awareness of the environment and the events that take place in it. Heider argued that it was through this awareness that one is able to make attribution and understand the particular reasons for the success or failure outcomes which occur during particular performances. For Heider, the attribution of a cause for a particular behaviour represents a "unit relation."

Heider believes that the organization of acts and dispositions into causal units is of great importance to the individual. This process provides the individual with a conceptual framework that will enable him to attach meanings and changes as they occur.

Because of the everchanging social environment in which one lives, Heider (1944:372) concludes that:

> . . . a change in the environment gains its meaning from the source to which it is attributed. This causal integration is of major importance in the organization of the social field. It is responsible for the formation of units which consist of persons and acts and which follow the laws of perceptual unit formation. Similarity and proximity favor the attribution of acts to persons; and established person-act units make for assimilation or contrast between the parts.

In Heider's later work (1958), the emphasis was less upon the factors that might produce over-attribution to personal causality than upon the rationale process involved in distinguishing among varying degrees of personal responsibility. Heider (1958) developed a theory of interpersonal relations, which was concerned with explaining the process by which an individual explains or interprets the outcome of an event. According to Heider, the two general classes of force that can cause an action are personal and environmental factors. He asserted that the amount of personal causality attributed would vary with the estimated extent to which the personal force had determined the effect.

The cognitive model of behaviour that Heider has formulated is one in which the stimulus is the perceived outcome of an event, the intervening cognitions are particular causal schema, and the consequences a wide array of expectancies, effect and behaviours that are influenced by the causal cognitions. This model is subsumed within the following general framework.

ANTECEDENT STIMULI ⟶ MEDIATING COGNITIVE EVENTS ⟶ BEHAVIOR

Figure 1. Model of cognitive theory of behavior.
(Source: Weiner, 1972:273)

As indicated previously, Heider specified that performance is perceived to be determined by personal and environmental forces. Among the personal factors, dispositional characteristics such as ability are distinguished from fluctuating factors such as effort.

> Whether a person tries to do something and whether he has the requisite abilities to accomplish it are so significantly different in the affairs of everyday life that naive psychology has demarcated those factors still further by regrouping the constituents of action in such a way that the power factor and the effective environmental force are combined into the concept "can," leaving the motivational factor clearly separate and distinct (Heider, 1958:83-84).

The concept: can. "Can" generally, is a dispositional concept which means that it refers to a relatively stable relationship between the person and the environment. Can implies that there is no force that will prevent the action being carried out. It expresses an ability, whether mental or physical, to complete the action.

The concept: trying. "Trying" has a directional and a quantitative aspect associated with it. The first aspect is usually called intention, the second is called assertion (Allport, 1947). The concept of trying indicates how hard a person will work to achieve a particular outcome. It is the intention, whatever its source, which gives to trying the characteristic feature of personal causality. Each situational outcome will therefore be interpreted by the observer in terms of how he personally feels that effort and ability contributed to the outcome. Thus the conceptions of whether or not an individual tried will influence the interpretation of the result. The second

force that Heider mentioned was that associated with the environment. Here he specified two types of forces, task difficulty and luck.

Task difficulty. This generally is inferred from social norms and from objective task characteristics, such as the steepness of a mountain to be climbed or the difficulty of a dive. The social norms may be more heavily weighted in task difficulty judgements. Weiner and Kukla (1970) reported that the greater the percentage of others succeeding at a task, the more likely, that a given success will be ascribed to the ease of the task. In a similar manner, the greater the percentage of others failing at a task, the more likely that a given failure will be attributed to the difficulty of the task. Heider relates task difficulty to the effort that is executed to complete a performance. He also associates the number of successful performances with the degree of difficulty. Heider (1958:89) cites the following example.

> If we know that only one person succeeded or only one person failed out of a large number in a certain endeavour, then we shall ascribe success or failure to this person - to his great ability or lack of ability. On the other hand, if we know that practically everyone who tries succeeds, we shall attribute success to the task. The task is then described as being easy. If hardly anyone succeeds it is felt to be too difficult.

Opportunity and luck. The attributing of luck as a causality factor will depend on the knowledge of previous performance. If for example an individual attempts a task say 50 times and succeeds only once, we would most likely attribute the successful result to luck. By the same token if a performer succeeds on all occasions with the exception of one, we would attribute his failure attempt to bad luck. The two terms, opportunity and luck, are commonly used to designate the more temporary states of outcome.

Heider (1958:91) stated:

> If the strength and direction of the environmental factors fluctuate, the person may wait until they are optimal for reaching his goal; i.e. he waits for a good opportunity. . . . Likewise a person is felt to succeed because he is lucky when the resultant environmental force in the direction of the goal is at a maximum or when the force away from it is at a minimum. Thus when success is attributed to luck or opportunity two things are implied: First, that environmental conditions rather than the person, are primarily responsible for the outcome, and second, that these environmental conditions are the product of chance; at least this is true for "luck."

In line with the dispositional character of "can," the unusual is attributed to luck and not the permanent "can" constituents. The attributing of an outcome to luck can also depend on our ideas concerning the person's ability, for example, if we have a low opinion of a person's ability then successful performances are attributed to luck. Often a successful performance by a person we intensely dislike will also be attributed to luck, just as a poor performance by a friend will be attributed to bad luck.

The initial work by Heider has been readily acknowledged as initiating interest in the area of attribution theory, and providing the layman with a method of explaining human behaviour. As Shaver (1975:35) notes, ". . . The comprehensive and fruitful work of Fritz Heider is a formalization of the ways in which any layman might try to understand the behavior of an actor."

Implicit in the theory underlying the attribution outcome is the assumption that a person in social interaction strives to improve the match between his expectancies which derive from characteristics attributed to the person being observed and the observed actions of the person. When discussing attributions Heider stressed the relationship that exists between stability and balance. Stability refers to

an individual's tendency to adhere to particular causality factors. That is, once a causal disposition has been made it is frequently associated with a particular environmental factor. Heider defines a balance state as a situation in which the relationship among entities fit together harmoniously and in which there is no stress to change. In essence, Heider assumes that when person p likes person o, he attributes positive attitudes and characteristics to him. This forms a balanced state between the two people. If, however, person p likes person o but learns he has a negative characteristic, the situation is unbalanced. The balance may be restored by deciding that the negative characteristic is not so important.

Summary

It can be seen then that the causal relationships that occur are central to Heider's description of how individuals attribute outcomes in everyday life. One of the major aims for Heider has been to gain an understanding of person perception, that is to identify the conditions that determine a person's perception of the environment and the people in it. In order to achieve this Heider has resorted to phenomenological and causality descriptions. Phenomenological description refers to the nature of the contact between the person and his environment as it is experienced by the person, whereas causal description refers to the analysis of underlying conditions that give rise to perceptual experiences.

In explaining the phenomenon of causal attributions, Heider has indicated the relationship which exists between personal factors such as effort, ability, intention and the external environmental variables such as luck and task difficulty.

Finally, Heider has given us a clear insight as to how we infer causations in everyday situations. The model which Heider established provided a theoretical framework for Jones and Davis (1965), Kelley (1967), and Weiner (1972), all of whom have fostered increased interest in attribution theory.

Theory of Correspondent Inferences

In attempting to make Heider's theory more amenable to empirical testing, Jones and Davis (1965) chose to concentrate on the effects produced by action and devised the Correspondent Theory. Jones and Davis (1965:222-223) stated that their major purpose was:

> . . . to construct a theory which systematically accounts for the perceiver's inferences about what an actor was trying to achieve by a particular action. In achieving this purpose {we} view the action as occurring within a particular situational context which defines, in large part, its meaning for the perceiver. In particular {we} shall attempt to show in great detail, the meaning of action - its intentional significance - derives from some consideration of the alternative action possibilities available to but foregone by the actor. As perceivers of action, we can only begin to understand the motives prompting an act if we view the effects of the act in the framework of effects that other actions could have achieved.

Following the work of Heider, Jones and Davis were intent on accounting for the attribution of specific intentions and dispositions on the basis of particular actions. That is to say, significance of a person's actions can only be derived when consideration is given to all of the alternatives that are available.

The Concept of Correspondence

The term correspondence was used by Jones and Davis to refer to the extent to which the act and the underlying attributes are similarly described by the inference. Thus, if two persons are

working together and one is ordering and criticizing another, then the correspondent inference is the one which indicates that the domineering behaviour is a direct reflection of the intention to dominate and hence of a disposition to be dominant. The correspondence will depend on the view and perception of observer. The interpretation of the situation will be made according to the particular perspective that the observer takes and the inferences that he makes. When assessing the outcome of any action, the cognitive task of establishing sufficient reason for that action is required. This involves processing available information, and making assumptions about the links between stable individual dispositions and the observed actions. After observing the action the perceiver has the basic task of deciding which of the effects, if any, were intended. In order to conclude that at least some of the effects achieved were intended, the perceiver must first believe that the actor was aware his action would have the observed effects. In other words, Jones and Davis assume that people desire to act in accord with their dispositions, that is within the limits of their abilities. As Jones and Davis (1965:221) said:

> In addition to assumptions about knowledge of consequences, decisions linking intentional attributes to the effects of action are also affected by the perceiver's judgements of the actor's ability to bring about the effects observed. Simply put, our actor cannot achieve his objectives solely by desiring to achieve them. He must have the capacities or skill to move from his present condition of desire to a subsequent condition of attainment and satisfaction. When a person's actions have certain consequences, it is important for the perceiver to determine whether the person was capable of producing these consequences in response to his intentions.

The level of correspondence of inference by the perceiver will therefore be dependent on his level of certainty that the actor

possessed the traits required to cause the action to occur. This link between a particular intention of disposition and a particular action has been called by Jones and Davis, an <u>attribute-effect linkage</u>.

The entire inference process is summarized in what Jones and Davis call the "action-attribute" paradigm illustrated in Figure 2. This diagram traces the course of the perceiver's inference from the observed effect on an action to the inferred disposition that the action is presumed to reflect.

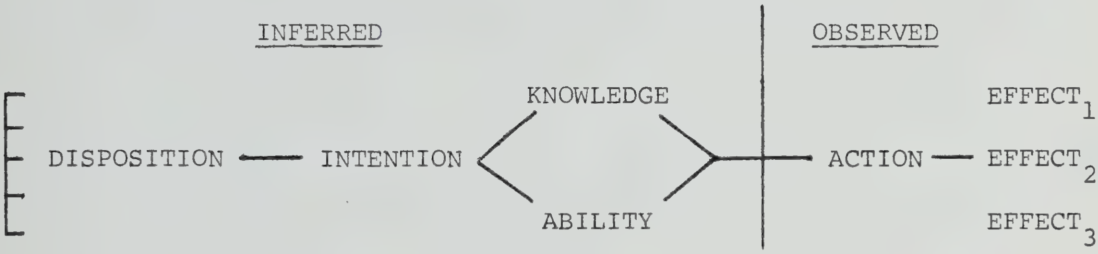


Figure 2. The action-attribute paradigm.
(Source: Shaver, 1975:49)

Working from the effects back to the disposition, the model assumes that the actor had the knowledge of the effects to be produced by his actions and had the ability to produce the action. Knowledge and ability are preconditions for inferring intentions from effects, and the intention is itself a precondition for inferring existence of the underlying disposition.

<u>Summary</u>

The theory of inferences developed by Jones and Davis (1965) attempts to explain a perceiver's inference about what another person is trying to achieve by a given action. This theory attempts to

account for the attributions of specific intentions and dispositions on the basis of particular actions, and to this extent it is an extension of Heider's analysis. The authors have shown a special interest in being able to specify the antecedent conditions that occur when attributing intentions or dispositions, after an action has been observed. Consideration has been given to the complexities that arise during the attribution process because of perceived personal needs. The two manifestations of the perceiver's personal involvement include hedonic relevance and personalism. The actor's choice is said to be hedonically relevant if it has either positive or negative consequences for the perceiver. An action is personalistic, in the perceiver's view, if it was uniquely conditioned by the latter's presence: if the perceiver believes he is the intended consumer of the effects produced by the actor. Central to the theory is the analysis by Jones and Davis of how the perceiver searches for the dispositional causes of an intention. They claim that a perceiver can obtain more information about an actor when the effects produced by the action are small rather than large and when the effects vary from the perceiver's criterion of desirability. The theory of correspondent inference derived by Jones and Davis (1965) has been an extension of Heider's original theory of interpersonal relations, in as much that it has been concerned primarily with analyzing how an individual is influenced when assigning causal attributions for perceived action. The theory provides us with a contrast which can be used to systematically account for the personal inferences that a perceiver makes about a particular action.

<u>The Attribution Theory of Kelley</u>

The theory of External Attribution proposed by Kelley (1967) is related to Jones and Davis' theory of correspondent inferences in that both have been derived from Heider's original work. Kelley's major concern relates to describing the process by which attributions are made to environmental causes, while Jones and Davis were particularly concerned with the circumstances under which the individual is seen as the cause of given effects.

Kelley (1967) defined attribution as the process of perceiving the dispositional properties of entities in the environment. He accepted Heider's view that there is a choice to be made between external attribution (environment) or internal attribution (to the self). The basic analytic tool Kelley has adopted is J. S. Mill's method of differences: the effect is attributed to that condition which is present when the effect occurs and is absent when the effect does not occur.

This principle of covariation between potential causes and effects is a central theme of Kelley's attribution theory and has been used to examine variations in effects with respect to entities, persons, time and modalities of interaction with the entity. The general hypothesis of Kelley's theory requires that for an attribution to be made to the environment rather than to self a number of conditions must be met. For an external attribution to be made; first, the actor must respond <u>differentially</u>, second he must respond <u>consistently</u> over time and modality and finally, he must respond in agreement with a <u>consensus</u> of other person's response. According to Kelley, the degree to which a person's attributions fulfill these criteria determines the confidence

with which a person can make external attributions. The criteria of distinctiveness, consistency, and consensus will determine the extent to which the cause of effect can be attributed to an external environmental factor. The four criteria for external validity are defined by Kelley (1967:197) as:

> Distinctiveness: the impression is attributed to the thing if it uniquely occurs when the thing is present and does not occur in its absence.
>
> Consistency over time: each time the thing is present, the individual's reaction must be the same or nearly so.
>
> Consistency over modality: his reaction must be consistent even though his mode of interaction with the thing varies.
>
> Consensus: attributes of external origin are experienced the same way by all observers.

It is according to the degree to which a person's attributions fulfill these criteria that he feels able and confident to make judgements quickly and take these actions with speed and rigour.

The Influence of Information Level

An individual's information level according to Kelley is dependent on the criteria of distinctiveness, consistency, and consensus. As previously mentioned these factors will determine the confidence with which an individual can make valid attributions. Kelley (1967:198) stated: "Information level is high for a person who can make high stable but differentiated attributions."

Kelley pointed out that the more information that one has at his disposal the more likely he will be able to make quick and accurate decisions in assigning the causal attributions. There will be the need however for those who are unable to make stable attributions to be dependent on others for information. In this instance they may search

for the required information amongst close associates. Kelley (1967:200) indicated that this low level of information may be due to the following conditions:

> (a) little social support, (b) prior information that is poor or ambiguous, (c) problems difficult beyond his capabilities, (d) views that have been disconfirmed because of their inappropriateness or nonveridicality and (e) other experiences engendering low self confidence.

Attribution processes like all perceptual and cognitive systems are subject to error. Using the framework of Heider's theory of interpersonal relations, Kelley has suggested that the reasons for making misattributions are: (a) ignoring the relevant situation and information, (b) making egocentric assumptions when the evidence for the attribution is incomplete, (c) allowing the magnitude of the affective consequences to bias the attribution and (d) the surrounding situation may be misleading. In addition to these factors, Kelley makes constant reference to the social and psychological factors that influence any situation when attributions are being made.

Summary

Kelley's attribution theory has extended the coverage to include self-attributions for internal states as well as including attributions to others. In proposing this theory, Kelley has endeavoured to provide an additional explanation of how people assign causes to environmental factors. The proposed relationship among the four criteria for external validity and the attributor's behaviour have provided a method of determining the stability of the attribution being made. This theory has complemented Jones and Davis' theory of correspondent inferences and has provided an insight into important considerations about the problem of external attributions.

Attribution Analysis of Achievement Behaviour

Following the original work of Heider (1958), many attribution researchers have investigated the causal elements associated with achievement related outcomes. Using Heider's schema it has been postulated that individuals attribute achievement outcomes to four major determinants of behaviour: ability (power), effort, task difficulty and luck. This schema according to Kelley (1972:151), can be described "in terms of a hypothetical matrix of data that summarizes the attributor's beliefs and assumptions about the distributions of the effect over various combinations of the causal factors." The attribution process that takes place has been systematically divided into three stages. According to Shaver (1975), these may be described as: an observation of an action, a judgement of intention, and the making of a dispositional attribution either to a person or to the environment. The process, in Shaver's (1977:139) terms, "makes up the cognitive phase of social perception, that is the perception of the social behavior of a person."

James and Rotter (1958) are credited with undertaking the first systematic examination of individual differences in causal attributions. Rotter's concern with causality followed the development of a "social learning theory" which stressed that modes of behaviour are learned in social situations. The three basic constructs included in the social learning theory are: behaviour potential, expectancy and reinforcement value. Rotter's formal theory of motivation states that the behaviour potential is both a function of the expectancy of a goal and the reinforcement value of that goal. Rotter and his colleagues proposed a one dimensional classification scheme of

perception of control, following Heider's theoretical framework. Control was either classified as within (internal) or outside (external) the person. Rotter investigated the effects of luck versus skill (in task situations) on the formation of general and specific expectancies. In a chance or luck situation the reward is externally determined. On the other hand, in skill situations the attainment of reinforcement is dependent upon a person's behaviour and reward is at least in part, internally determined. In situations perceived as determined by chance the reinforcement may result in changes of expectancy that differ from the expectancy changes following goal attainment in skill-defined settings.

The one dimensional classification scheme utilized by Rotter was seen to have a number of limitations and consequently Weiner *et al.* (1971) developed a model whereby the four causal elements were comprised within a two dimensional taxonomy. One dimension is described as the internal-external locus of control continuum of causes, with ability and effort comprising the properties that are internal to an individual, and task difficulty and luck being external causes. The second dimension categorizes the same causes according to stability and instability. Ability and task difficulty are the stable causes, while effort and luck are unstable. The two main dimensions of these causal elements are illustrated in Figure 3. Weiner *et al.* (1972:96) have described the dimensions as follows:

> Two of the four components in the model (ability and effort) describe the qualities of the person undertaking the activity, while the two remaining components (task difficulty and luck) can be considered to be properties external to the person, or environmental factors. Further, two of the elements (ability and task difficulty) have somewhat enduring characteristics, whereas the magnitudes of the two remaining components (effort and luck) are relatively variable.

Stability	Locus of Control	
	Internal	External
Stable	Ability	Task Difficulty
Unstable	Effort	Luck

Figure 3. Weiner's classification scheme for perceived determinants of achievement behavior.
(Source: Weiner, 1974:6)

Although studies by Frieze (1973) and Frieze and Weiner (1971), have indicated that further causal factors do exist, e.g. mood, fatigue and bias, it is contended that the four causal elements established by Heider generalize to all achievement tasks and account for the major source of variance when success and failure outcomes are being examined. The classification scheme indicated in Figure 3 makes it possible to examine and attribute the causes of any particular behavioural outcome within the two basic dimensions: locus of control (internal versus external) and the degree of stability (fixed versus variable).

Weiner's 1972 attributional model for achievement behaviour is presented in Figure 4. The cognitive and behavioural sequence is illustrated in three stages. In the Task Evaluation stage, the subject perceives the potential attributions and assesses their relationship to success and failure. This causal analysis determines the future expectancy of success or failure and results in an approach or avoidance behaviour. This sequence is seen in stage 2. Finally, the

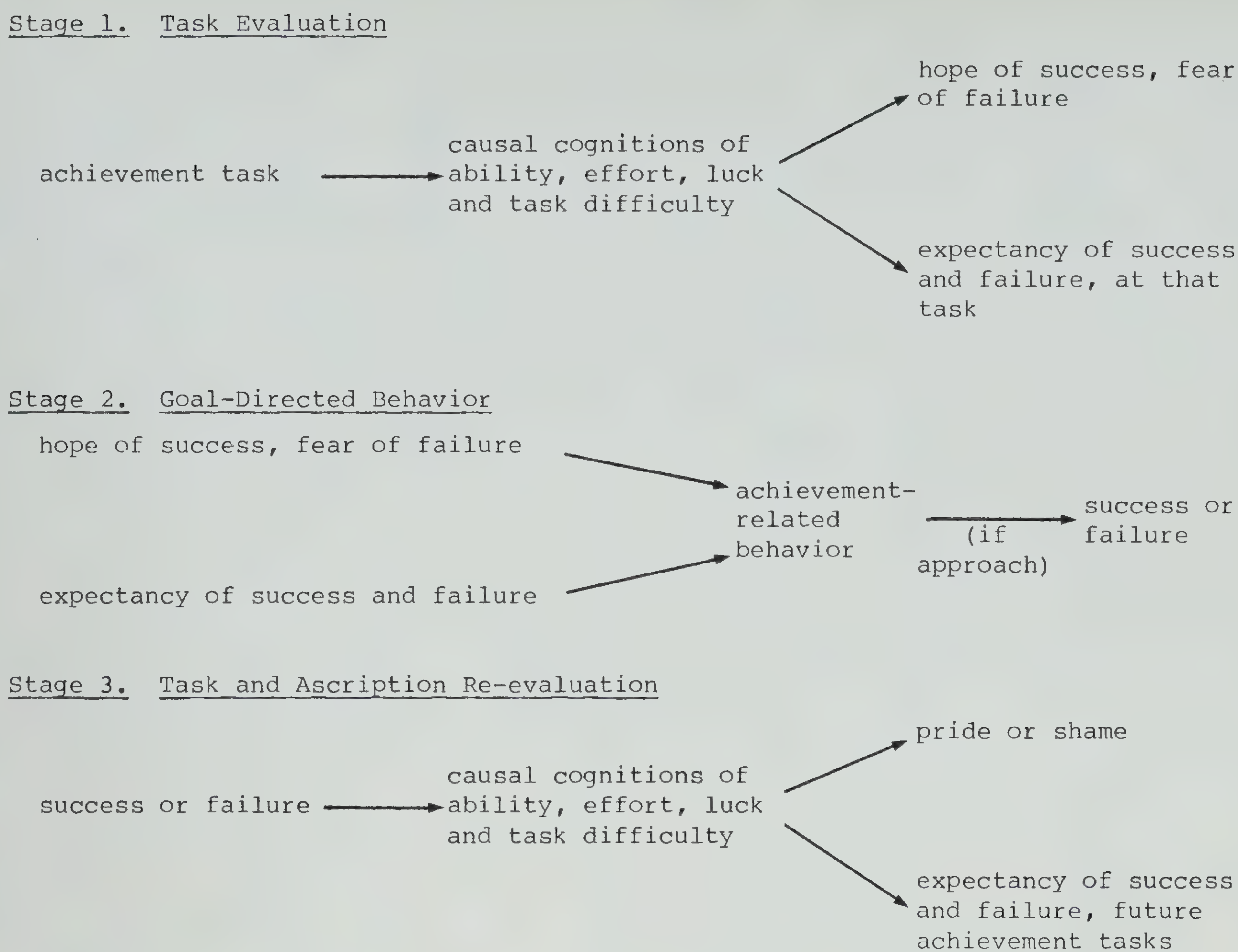


Figure 4. Cognitive and behavioral sequence in an attributional model of achievement behavior.

(Source: Weiner, 1973:355)

causal attributions are evaluated as a function of the achievement outcome and new information concerning the task is gained. The attributions made, determine achievement-related effects and the expectancy for success at future tasks.

The attributional processes related to achievement behaviour are appropriate for the kind of investigation being undertaken in this study. With the principal questions being concerned with (a) determining the causal attributions that children associate with success and failure, and (b) establishing a programme designed to help these children to cope with failure, the relevance of the attributional model of achievement motivation becomes immediately apparent. This relationship is supported by Andrews and Debus (1978:154) who pointed out, "the key to this model is the assumption that causal beliefs about success and failure experiences have important consequences for subsequent feelings, expectancies and behavior."

Attribution and Achievement Motivation

The classification scheme presented in Figure 3 was criticized by Rosenbaum (1972) because of a number of deficiencies and limitations that existed in the format. To overcome these deficiencies, he proposed the three dimensional taxonomy presented in Figure 5. Rosenbaum suggests intentionality as the third causal dimension to be included with the locus and the stability of the cause. Weiner (1974:7) acknowledges this proposal and points out the difficulties with this concept:

> Rosenbaum's analysis opens up many new issues for investigation, particularly related to the effects of social context upon the causal evaluation of achievement outcomes. But he has also

voiced a host of new complex issues that are difficult to assimilate at this time.

	Intentional		Unintentional	
	Stable	Unstable	Stable	Unstable
Internal	stable effort of self	unstable effort of self	ability of self	fatigue, mood and fluctuations in skill of self
External	stable effort of others	unstable effort of others	ability of others, task difficulty	fatigue, mood and fluctuations in skill of others, luck

Figure 5. A three dimensional taxonomy of the perceived causes of success and failure.

(Source: Rosenbaum, 1972:21)

Further experimental studies conducted to catalogue the perceived causes of success and failure were carried out by Frieze (1973). In two separate investigations it was possible to categorize 86 percent of the responses. Ranging from the most frequently attributed cause, these categories were ability, effort, task difficulty, luck, teacher bias, mood, effort expenditure and fatigue. This free response data supported the intuitions of Heider and other attribution theorists who were responsible for originally adopting the four causality attributes. Other possible causes and dimensions have been suggested in the more recent studies by Frieze (1976) and Cooper and Burger (1978), however research tends to emphasize the four causal factors as being the most general and salient factors of achievement motivation.

Weiner (1972, 1974) has been predominantly responsible for the resurgence of research into attribution theory over the last decade.

The development of his attributional analysis of achievement motivation is presented in Figure 6. Weiner contends that the causal attributions for success and failure mediated between antecedent-consequent relationships in achievement related contexts. A number of antecedent cues act as a basis from which the causal ascriptions for success and/or failure are inferred. These cues include such information as: past outcome history, social norms, performance peak, patterns of performance, persistence, task characteristics, causal schemata, individual difference characteristics and achievement-related needs. These antecedent cues will directly influence the attributions made by the individual when performing the task. According to Weiner, attributing an outcome to one or more of the causal factors will influence the future expectancy of success and the effective consequence of achievement performance. When discussing the effects of locus of control on the expectancy of goal attainment Weiner (1974:80) states that:

> Research findings indicate that ability and task difficulty (factors respectively classified as internal and external in locus of control) are both perceived as causes of personally consistent events, whereas effort and luck (also respectively classified as internal and external in locus of control) are both perceived as causes of inconsistent events. It is therefore suggested that the increased expectancy of success following a positive outcome, i.e. the anticipation of consistent outcomes, result from attributions to what might be labelled stable elements (high ability and/or easy task), regardless of the locus of control of the causal attribution. Conversely, relatively smaller increments or actual decrements in expectancy of success after goal attainment, i.e. the anticipation of inconsistent outcomes, may result from attributions to what might be labelled unstable elements (unusual effort and/or good luck), regardless of the locus of control factor.

Weiner's model indicates the consequences that evolve from attributing outcomes to a particular cause or causes. Research results linking causal ascriptions and emotional consequences of success and failure reveal that pride and shame are maximized when achievement

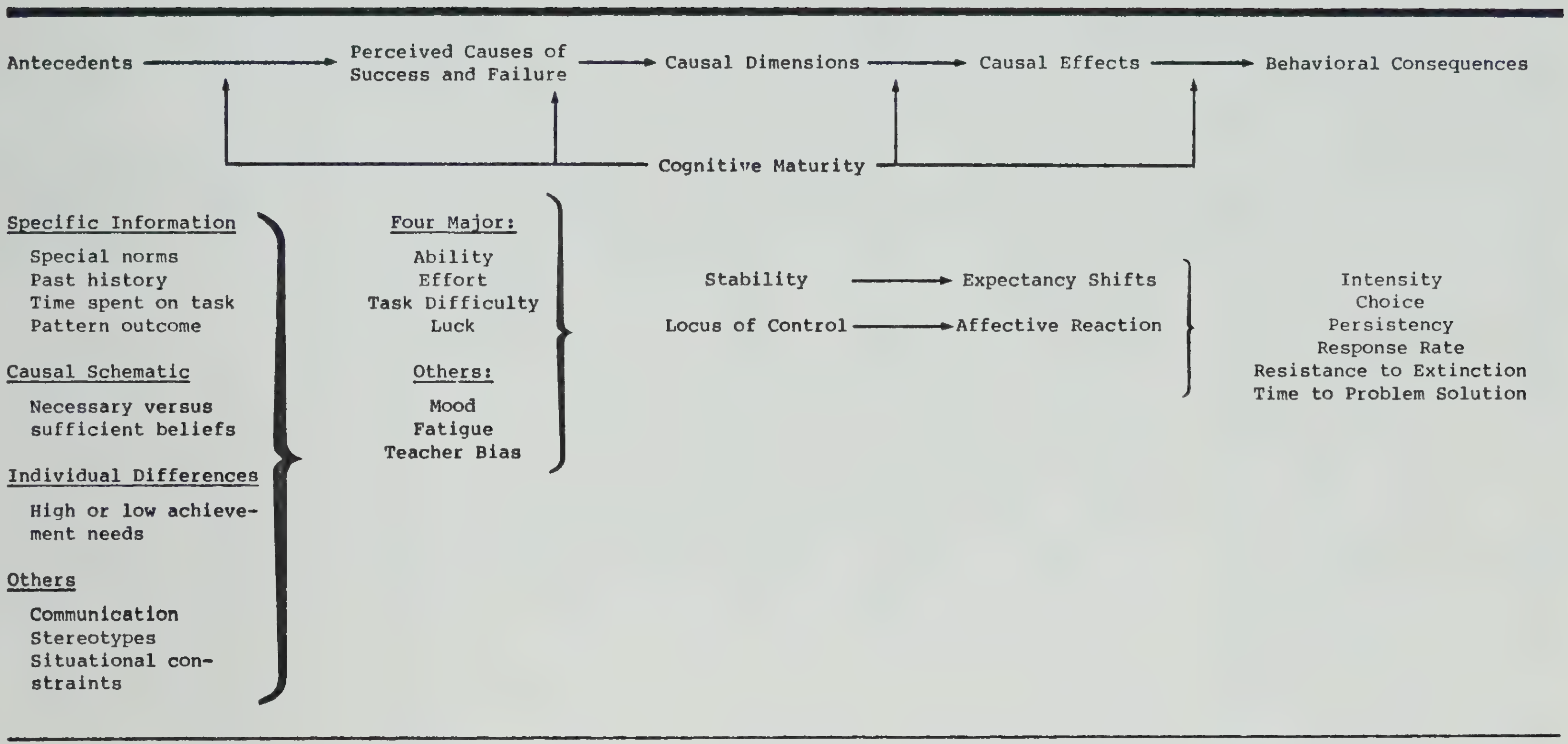


Figure 6. An attributional (expectancy-value) model of achievement motivation.
(Source: Weiner, 1974:48).

outcomes are ascribed internally, and minimized when success and failure are attributed to external causes. Thus, success attributed to high ability or hard work is expected to produce more pride than success that is ascribed to the ease of the task or to good luck. Similarly, failure perceived as due to low ability or a lack of effort is expected to result in greater shame than failure that is attributed to a hard task or bad luck.

The stability dimension in Weiner's model explains changes in expectancy of future success or failure. If previous success is perceived by the subject to be caused by such factors as luck, future expectancy of success would be low, as luck is an unstable factor. However, if success was attributed to ability, which is classified as a stable factor, then expectancy of further success in the future would be high. Similarly, attributing failure to task difficulty, a stable factor, results in low expectancy for success on that task in the future. Low expectancy of success would also result from attributing failure to lack of ability. When failure is attributed to a lack of effort, the expectancy of being able to succeed at that task in the future is usually high, as effort is an unstable factor, and the individual reasons that provided more effort is made, success is possible. The crucial factor in the formulating of these attributions revolves around the individual's background and past experience. The approach that one makes to a situation will depend on the previous success he has experienced. In the particular samples chosen for this study it was anticipated that the level of achievement needs of the non-retarded boys would be different from the retarded boys. It was also anticipated that the causal attributions of the retarded sample would differ from the non-retarded sample

as a result of their past failure and low achievement needs. Smith (1977:4) summarizes this concept:

> . . . people who consistently experience success are people with high achievement needs. They value success, strive to attain it, and experience it frequently. On the other hand, people who more often experience failure are defined as having low achievement needs. It is likely that these people would prefer success but for whatever reasons have come to accept failure at least in specific situations.

A series of studies (Bar-Tal and Frieze, 1977; Kukla, 1972; Weiner and Kukla, 1970; Weiner and Potepan, 1970) has shown that those subjects with high achievement needs are more likely to attribute success to ability and effort, and failure to lack of effort. It is also evident that they approach achievement situations with more self confidence and take a greater pride in achieving a successful outcome. By the same token, those students who have low achievement needs do not offer a straight forward explanation for success. There is a tendency for success to be attributed to the external causes of good luck or an easy task. The low achiever does not usually attribute success to personal attributes of ability or effort with the result that little pride is taken in being successful. Challenging and achievement situations are avoided because of the lack of personal confidence. While the person with low achievement needs has no adequate explanation for his occasional success, he definitely exhibits a pattern in failure attributions. Failure is consistently attributed to his own lack of ability. This of course reinforces personal low self-esteem and influences attitudes and approaches to future tasks.

The relationship between causal attributions and performance has been illustrated by Smith (1977) in Figure 7. This presents the probable outcomes following attributions for success and failure experiences

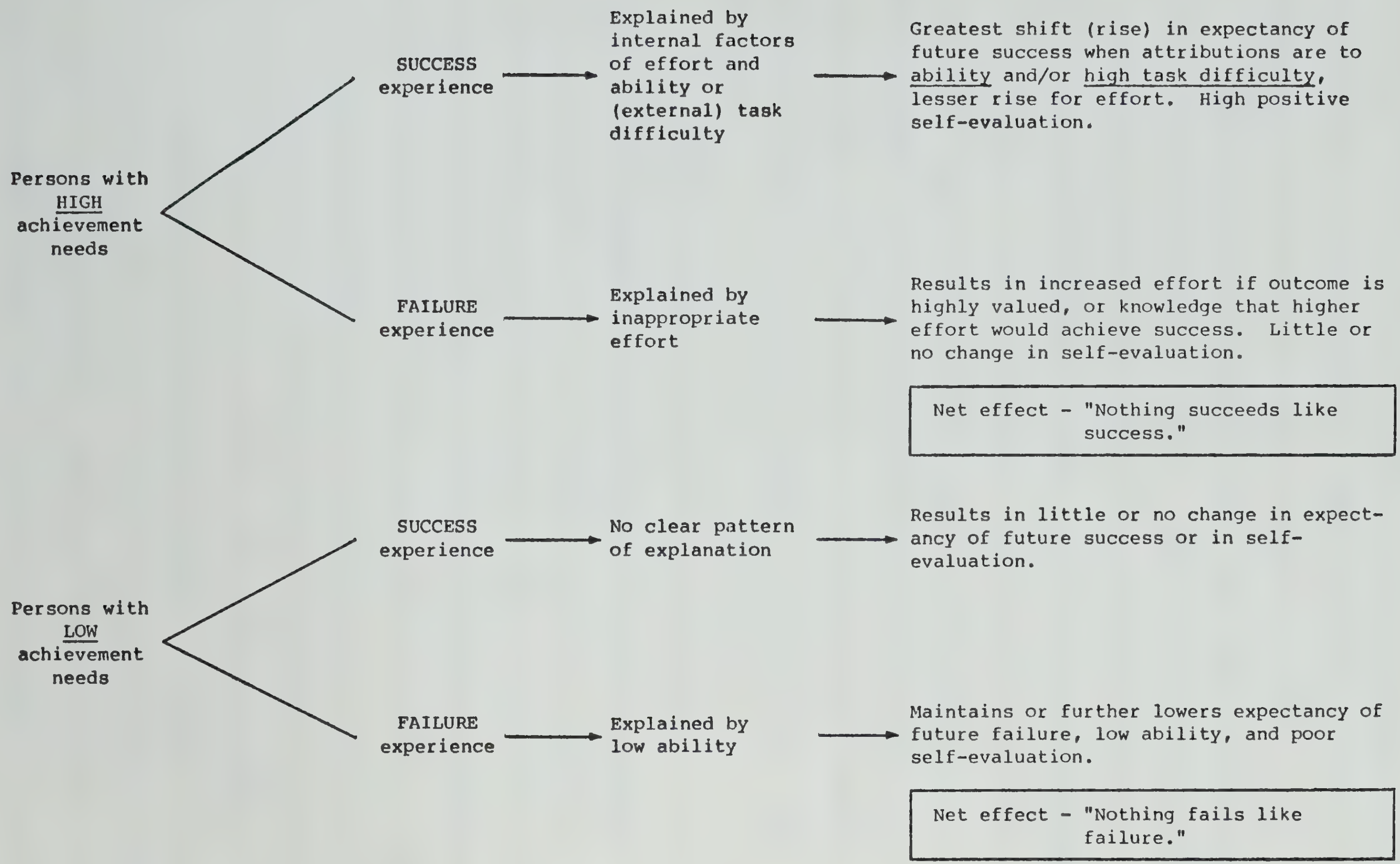


Figure 7. Schematic representation of research results of differential effects of success/failure on high and low achievement need persons.

(Source: Smith, 1977:Figure 2).

involving high and low achievement need students. Continual success and/or failure performances will reinforce the level of self-esteem and consequently will also be reflected in the level of achievement motivation of the student to perform on future occasions.

The level of achievement motivation will also be influenced by the individual's perception of the task. When relating this example to the everyday tasks facing the student in the classroom, Smith (1977:10) says "he either consciously or otherwise sees it as structured as a skill task, a chance task or a combination of the two." The tasks will be defined and categorized according to whether the subject feels the outcome depends on internal or external factors, e.g. skill or luck. More specifically the chance task would be identified as depending on luck, while the skill task would be associated with effort/ability attributes.

Individual assessment of the level of task difficulty provides a second form of analysis by which the subject is able to perceive a task in an achievement situation. Investigations have shown that individuals with high achievement needs will choose tasks with an intermediate level of difficulty, whereas subjects with low achievement needs will choose tasks that are very easy, and thus able to be performed, or tasks that are completely beyond their capabilities, thereby providing the level of difficulty as the obvious reason for failure. Research by Weiner (1974) and Trope and Brickman (1975) established that a task with an intermediate level of difficulty arouses the greatest emotional or affective reaction and, provides maximum feedback about capability and means to improve performance. Task difficulty can also be assessed via the information feedback that one received about others' performances

on the same task. If the subject fails where many have succeeded, then he immediately becomes aware that this could be caused through his limited ability or lack of understanding of the task. Conversely, when the person succeeds while many others are failing, it becomes very easy to attribute this success to high ability. This feedback enables each individual to assess himself with respect to his peers. The result in many instances serves to confirm evaluations of high or low ability levels.

The reviewed research has shown that the individual differences in perceiving causes for success and failure affect achievement behaviour. It is applicable at this time to make a closer examination of the influence of the various factors on the attribution of causation for success and failure. The first factor to be considered is the relationship between the situational outcome, i.e. success versus failure. The second is the influence that is exerted by stable individual differences on the outcome-attribution relationship. As mentioned previously, the attribution research into causation of achievement-related situations has focussed on the four causal attributes originally derived by Heider (1958). The four attributes, ability, effort, task difficulty, and luck have been categorized by Rotter (1966) and Weiner _et al._ (1971) into internal and external characteristics and further subdivided into variable and stable dimensions. The attribution model illustrated in Figure 3 has provided a framework for the majority of research carried out utilizing attribution theory. Extensive investigation has been concerned with the examination of the process of self attribution as related to success and failure.

Causal Attributions for Success and Failure

Studies that have been performed to determine the causal attributions for success and failure have identified two differing patterns emerging from the respondents. The first pattern, the logical analysis, develops Heider's (1958) naive analysis of action and the model of Weiner and associates (Weiner *et al.*, 1971); the second, the defensive and self enhancing analysis has developed from research performed by Feather and Simon (1971), Fitch (1970), and Frieze and Weiner (1971). The logical analysis assumes that individuals will use available information in a logical fashion to draw conclusions about the causes of outcomes. Nicholls (1975:379) when utilizing the logical analysis approach described it as follows:

> This analysis compares different patterns of feedback in terms of information they provide concerning the operation of a given causal factor. It has been formulated to apply specifically to situations in which subjects are inferring the causes of outcomes of their own behavior, not imagined outcomes or outcomes of others' behavior. It is further assumed that all subjects apply and perceive themselves as applying moderately consistent and high effort on the task. . . . The logical analysis also applies to situations in which subjects have clear information relevant to task difficulty in which task difficulty is moderate. . . . In such situations, task difficulty provides a relatively unlikely explanation for either success or failure, and subjects have neither more or less logical basis for attributing success to task difficulty than do low-scoring subjects for attributing failure to difficulty. Thus, in developing the logical analysis the major problem is to predict attribution to ability, effort and luck.

Research involving the study of self attributions has revealed two factors, self enhancement and approval-seeking behaviour, can influence the individual's attribution response. This behaviour has been termed defensive or self-enhancing behaviour and results in greater attributions of successful outcomes to internal factors (effort and ability) and failure to external factors (task difficulty and luck).

The logical and defensive analyses develop different patterns of predictions. The logical position predicts that given a condition of moderate effort, subjects will infer that success is due to high ability while failure is due to low ability, while the defensive response would result in a greater attribution of success than failure to ability. The two analyses predict higher attributions of success than failure to effort. If subjects try and succeed, they can logically conclude that effort was the cause of success. However, if the subject tries but fails, this means that lack of effort could not be attributed to causing the failure; defensive responding also leads to this result.

When attributing causality to luck there should be no difference between success or failure in the availability of cues relative to luck. The logical analysis predicts equal attribution of success and failure to good and bad luck respectively. On the other hand, the defensive analysis indicates a greater attribution of failure than success to luck.

The data in the achievement literature reveals a consensus of opinion between the two perspectives, believing that success is more likely to be attributed to internal factors (ability and effort) than is failure. This relationship has been confirmed in studies performed by Kukla (1970), Frieze and Weiner (1971), and Luginbuhl *et al.* (1975).

Stable Personality Characteristics

The problem of classifying causal attributions made in achievement-related situations has repeatedly arisen in research projects in recent years. Researchers have concerned themselves particularly with identifying the influence that stable personality characteristics have upon the attributor's selection of causal attributes. These stable characteristics

have been referred to as factors that classify persons as being internally or externally controlled. As a personality variable, internal control refers to individuals who have strong expectancy toward "the perception of positive and/or negative events as being a consequence of one's own actions and thereby under personal control" (Lefcourt, 1966:207). External control refers to individuals characterized as having a strong expectancy toward "the perception of positive and/or negative events as being unrelated to one's own behaviors in certain situations and therefore beyond personal control" (Lefcourt, 1966:207). There is evidence to indicate that the loci of control concept may be a relevant factor in determining how individuals make attributions.

Locus of control. Rotter (1966:11) defines the construct of internal-external locus of control as follows:

> When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as a result of luck, change, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by the individual, we have labelled this a belief in external control. If the person perceived that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control.

This classification has resulted in research to determine whether internally controlled individuals attribute success and failure outcomes to internal causes, while externally controlled individuals attribute outcomes to external causes. Early research conducted by Dies (1968), Fitch (1969), and Lackey (1968), has not tended to support that hypothesis. Inconsistencies have been revealed by the outcomes of more recent research in this area. A study by Phares, Wilson and Klyver (1971) reported externals as blaming themselves for failure more than internals, while Davis and Davis (1972), found that after failing, externals were more

likely to attribute the outcome to bad luck (external source) rather than lack of ability (internal source). In the same study by Davis and Davis (1972), the internally controlled subjects showed a greater tendency to blame themselves for failure, attributing this outcome to personal factors (ability and luck). Under success conditions there was not significant difference between the two groups. It was, however, reported that successful groups were more likely to attribute this outcome to internal factors than were subjects who failed. This pattern of interaction has also been reported after success and failure outcomes by Lefcourt, Hogg, Struthers and Holmes (1975).

Reappraisal of the internal-external attributional assignment phenomenon performed by Gilmor and Minton (1974) reported finding a success-failure main effect. Successful subjects were reported to be more internal in their attribution of responsibility than were those subjects who failed. This latter group tended to attribute responsibility for failure to bad luck. These findings coincided with those obtained by Davis and Davis (1972) and Lefcourt _et al._ (1975). The most important finding according to the authors was, "the demonstration of the salience of I-E as a predictor of causal attribution" (Gilmor and Minton, 1974: 172). The results demonstrated an interaction pattern of I-E and success-failure that differed from previous findings: internals were significantly more internal in their attribution for success than were externals. Under failing conditions the opposite trend was found; internals tended to attribute responsibility for the outcome externally to a greater degree than did externals.

Gilmor and Minton refer to the inconsistency in the findings of studies related to the effect of performance outcome on attribution

responses, and argue that these may have resulted from ego-defensive strategies adopted by the subjects. This phenomenon described the procedure whereby individuals attempt to maintain or enhance self-esteem by ascribing failure outcomes to external attributes, and successful outcomes are attributed internally. Experimental artifacts are also mentioned by Gilmor and Minton as causing inconsistencies in experimental results in attributional studies. Specific reference is made to the Davis and Davis (1972) study where subjects were told what specific ability level each score represented. Associations made by the subjects between performance outcome and ability appear to have influenced the subject's attributional responses. It becomes necessary in any experimental research for the experimenter to be consciously aware of the intrusion of such artifacts and to make every effort to eliminate them from the design.

The conceptual analysis of locus of control, has provided an important theoretical foundation for understanding behavioural effects. This model has been utilized extensively in personality research, particularly where attention has focussed on investigating expectancy of success and/or expectancy shifts. The studies that have been reviewed in this section have all used the internal-external locus of control scale to differentiate and classify their sample. Weiner (1974:105) points out that "the formulation of Rotter is now deficient in many respects, and must give way to other theoretical frameworks." In other words, to categorize individuals as internals and externals is too restrictive when self attribution for success and failure outcomes are made. Weiner _et al._ (1971) noted that the four causal factors may be comprised within a two dimensional model: locus of control and the

stability factor. Research conducted by these authors indicated that attributions may be made for successful outcomes to high ability and ease of task (factors differing in control but identical in stability) and thus when research is limited to utilizing the one dimension of internal/external classification confounding results may be obtained. A summary of the research examining the effects of causal stability, as well as locus of control, on performance outcomes has been compiled and after comparing the stability and locus of control dimensions Weiner, Nierenberg and Goldstein (1976:65) conclude:

> . . . It is evident from research summarized. . . and the present study that there are dimensions of causality in addition to locus of control. The concentration of research upon any single causal dimension, to the exclusion of other dimensions, constrains both empirical and theoretical growth. . . . There are important differences between, for example ability and effort, or luck and powerful others, although these dissimilarities have not been distinguished in locus of control theory and research.

The utilization of Rotter's scale and the resultant classification of individuals has been highlighted by Lefcourt, "the very process of classification has often led investigators into believing that people are internals or externals" (Lefcourt, 1976:128). This, according to Lefcourt (1976) is where many researchers have been misdirected. The locus of control scale should not be used solely as a uni-dimensional measure. Research carried out by Gurin, Gurin, Lao, and Beattie (1969) and Mirels (1970) (cited by Lefcourt, 1976), has identified separate factors. Gurin _et al._ (1969) found separate factors for personal as opposed to general causality. The first factor, "control ideology" appears to measure the respondent's ideology or general beliefs about the role of internal and external forces in determining success or failure in the culture at large. The second factor, "personal control," indicates whether a person has control over what happens in

his own life. Mirels (1970) was the first of many to report finding two factors in Rotter's scale, one concerning felt mastery over the course of one's life, and the other, the extent to which individuals can exert impact on political institutions. The two factors were called "felt mastery" and "system control."

Summary

In summarizing the utilization of the locus of control construct, Lefcourt (1976:153) suggests the following guidelines:

> First, the locus of control construct per se should not be expected to account for a lion's share of the variance. The perception of control is but a single expectancy construct.
> Second, people are not totally internals or externals. . . the terms internal and external control depict an individual's more common tendencies to expect events to be contingent or non-contingent upon their actions.
> Third, if one wishes to use the perception of control as a powerful predictor, then it will most always be profitable to design one's own assessment devices for the criterion of interest.

Rotter's (1975) article presents a viewpoint which is very similar to that expressed by Lefcourt. The concurrence of opinion is expressed in the following summary.

> Factor analysis of the locus of control scale may be useful if it can be demonstrated that reliable and logical predictions can be made from the subscales to specific behaviors and that a particular subscale score produces a significantly higher relationship than that of the score of the total rest (Rotter, 1975:63).

The position adopted by Lefcourt (1976) and Rotter (1975) is based on the findings of research performed by Gurin et al. (1969), Mirels (1970), Lao (1970), and MacDonald and Tseng (1971). These findings, in addition to providing a new insight into locus of control, have presented a possible explanation for the contrasting results that have been reported by Lefcourt et al. (1975), Gilmor and Minton (1974) and Davis and Davis (1972). Provided the suggestions are undertaken by

future experimenters, and subscales are adopted that are relevant to the particular area, the variance in results may be controlled. It therefore becomes necessary for researchers to determine whether causal perceptions are pertinent to given criteria and purpose, and to consider carefully the relevance of the subscale selected for the specific area of interest.

The attributional analysis of achievement-related situations is particularly relevant to the research being carried out in this study. The effects of attributional bias associated with success and failure situations has developed a new area of research relating attributional theory to the concept of learned helplessness. In the following section, a review of the most recent research which has utilized these two phenomena will be presented.

Learned Helplessness: A Theoretical Perspective

A Theoretical Perspective

The phenomenon of impaired performance following failure with mentally retarded and normal children has been well documented. Early research by Gardner (1957), Cromwell (1963), Butterfield and Zigler (1965), and Bialer and Cromwell (1965) was mainly concerned with the motivational effects that resulted from success and failure. Little interest was shown in determining the affective processes that were associated with the outcomes. In the last decade there has been a revival of interest into causes and effects of performance deficits. This renewed interest has originated from initial research performed by Seligman. The learned helplessness theory, originally formulated on the basis of laboratory experiments with infrahuman species has now

been extended to research with human subjects and has been closely linked with the concepts of social learning and attribution theory. Thomas (1979:209), when reviewing the research being carried out in this area refers to learned helplessness as "a phenomenon by which an individual learns over a series of trials that he/she has no control over the outcome of the events."

Seligman (1975) suggests that learned helplessness consists of three interrelated areas of disturbance: (a) motivational (b) cognitive (c) emotional. More specifically, Seligman (1975:76) hypothesized that learned helplessness:

> (1) reduces the motivation to control the outcome; (2) interferes with learning that responding controls the outcome; (3) produces fear for as long as the subject is uncertain of the uncontrollability and then produces depression.

At this point in time research evidence does not allow a distinction between the cognitive and the motivational explanations for the deficit in performance that occurs in performance when a condition of learned helplessness occurs. The deficits may have a cognitive or motivational basis or they may result from an impairment of both processes.

A reformulation of the "learned helplessness" hypothesis based on a revision of attribution theory was proposed by Abramson, Seligman and Teasdale (1978). According to the reformulation, the individual's perception of outcomes will be affected by attributions which may be classified as stable, or unstable, global or specific and internal or external. The choice of attributions will influence the degree of seriousness of future helplessness.

The early helplessness theory encountered conceptual problems when applied to human helplessness. Subjects under experimentally

induced helplessness were unable to distinguish if continued failure was caused by a personal lack of ability or whether all subjects were experiencing similar failure. The analysis resulted in Abramson _et al._ (1978) being able to distinguish between situations classified as universal and personal helplessness. The distinction between these two categories was illustrated by Abramson _et al._ (1978:52).

> The parent believed the cause of the child's disease was independent of all of his responses as well as the responses of other people. We term this situation universal helplessness. . . . Regardless of any voluntary response the person made, however, the probability of his obtaining good grades was not altered. We term this situation personal helplessness.

Relating this to the failure experienced by school-age children, it is clearly evident that constant failure to achieve would be classified as personal helplessness. Continued failing experiences will reinforce the child's belief that he is unable to cope with difficult situations and will eventuate in a low level of expectations and low self-esteem. It is apparent that programmes designed to alleviate helplessness would be primarily concerned with the development of personal skills and the perception that an individual has of personal behaviour and resultant outcome.

Learned Helplessness: Attributions and Expectations

A number of studies have focussed on the relationship between an individual's causal perception of success and failure and achievement related behaviour. Many have investigated the consequences of failure attributions, investigating the phenomenon described by Seligman (1975) as "learned helplessness." Within the attribution taxonomy, research results have indicated that when the outcome is success, the likelihood of ability and effort attributions increases as task difficulty increases.

On the other hand, in a failure situation, as the task difficulty is perceived to decrease, ability and effort attributions are more likely (Weiner and Kukla, 1970). The more consistent the prior history of success or failure, the greater the tendency to explain these events in terms of ability (Frieze and Weiner, 1971). Although the majority of research has been performed on adult samples, recent results (Karabenick and Heller, 1976; Shaklee, 1976) suggest that causal judgements involve logical, integrative skills which develop throughout childhood. Effort attributions become increasingly important with age, such that effort may be more highly valued than the outcome itself in the 10-12 year age range (Weiner and Peter, 1973).

One of the first attempts to relate causal attributions for performance outcomes to the concept of learned helplessness in children was performed by Dweck and Repucci (1973). While performing block design tasks the children were subjected to experimentally-induced non-contingent failure, and identified as persistent or helpless. The children's attributions for success and failure were assessed from the Intellectual Achievement Responsibility Scale which is designed to measure children's acceptance of responsibility for academic successes and failures (Crandall, Katvosky, and Crandall, 1965). The results indicated that the more persistent subjects showed a greater internal responsibility for achievement outcomes than did the helpless children. It was also shown that the less persistent subjects took less personal responsibility for outcomes. A more recent study (Diener and Dweck, 1978) identified groups of helpless and mastery-oriented children on the basis of effort-attributions and found that helpless children made the expected attributions for failure to lack of ability, whereas the mastery-oriented

children made surprisingly few attributions. Instead, they engaged in self-monitoring and self-instruction, and focussed on the processes necessary for the remedy of failure.

The linking of deterioration in performance with failure outcomes has been indicated in studies performed by Andrews and Debus (1978), Diener and Dweck (1978), Dweck (1975), Dweck and Repucci (1973), and Seligman (1975). The helpless subjects have consistently attributed failure to lack of ability, a stable internal dimension, and success to factors beyond personal control. These outcomes have resulted in a number of studies being conducted to investigate the potential of attribution retraining programmes designed to induce appropriate, achievement-enhancing attributions in children who typically surrender in the face of failure and display self-defeating attributional schemata.

Attributions and the Alleviation of Learned Helplessness

The first attempt to relate previous helplessness and attribution research to children was made by Dweck (1975). She sought to determine whether a treatment that altered attributions for failure would improve children's subsequent performances in the face of failure. The subjects who were identified by school personnel as "extremely helpless" were assigned to either an attribution retraining treatment or a success-only treatment for 25 daily sessions. The two treatments involved training on identical problems; however, the subjects in the attribution retraining programme were subjected to interpolated failure trials, for which the experimenter verbally attributed failure to a lack of effort. Following the training period, all subjects were subjected to failure experiences and results indicated that children who had experienced the

"attribution retraining" programme improved and persisted at the problem solving task while the performance of those who had experienced "success-only" treatment deteriorated.

This study indicated the feasibility of implementing attributional retraining programmes. Dweck's paradigm was reworked by Chapin and Dyck (1976) in order to assess the differences due to attribution training and partial reinforcement. Control groups of primary school children who were reading below grade level were established to determine the effects of continuous reinforcement, attribution training, and three levels of partial reinforcement. Persistence was measured by the number of difficult sentences attempted. The superiority of the attribution training over continuous reinforcement was indicated in the results.

Another approach in altering causal attributions by changing teaching strategies was successfully performed by Heckhausen (1975). Utilizing under-achieving fourth grade students who were experiencing continual failure, Heckhausen and his colleagues, with the cooperation of the classroom teachers, integrated effort-attributional comments for performance into the daily classroom procedures. After a four month treatment period it was noted that the children more frequently ascribed failure outcome to lack of effort than to lack of ability. It was also noted that their level of aspiration following failure was less frequently lowered following failure.

Work by de Charms (1976) on training teachers to implement personal causation programmes with their students was seen to be effective for improving academic performances and increasing personal responsibility for outcomes. This concept is a specific application of attributing causal outcomes to one's self. As de Charms (1976:5) stated,

"to help a person to be an origin is not to determine his goals but to help him develop a commitment and purpose so that he can reach his goals effectively." In order to promote "origin behavior," de Charms emphasizes the necessity to develop planning and goal-directed behaviour, internal goal setting and personal responsibility. Using sixth and seventh grade subjects, de Charms was able to successfully show the benefits of implementing the factors into a training programme in the school setting.

Andrews and Debus (1978) have further demonstrated the benefits of attribution retraining programmes. Children who least frequently attributed failure to lack of effort were identified by direct situational procedures and randomly assigned to treatment programmes of either social reinforcement, or social reinforcement plus tokens for effort attributions made for performance outcomes, on a block design task. Both treatment conditions increased successful performances on parallel forms of a training task as well as two independent tasks. There were also significant increases in effort attributions and the degree of persistence on perceptual tasks.

In reviewing the retraining programmes that have been implemented in learned helplessness research, Brustien (1978:8) states, "the success of attribution retraining lies in the fact that children were supplied a strategy to control a traumatic experience of failure." This traumatic experience is ever present in the minds of the mentally retarded children, and recent research has positively identified learned helplessness in these children.

Learned Helplessness and the Mentally Retarded

Helplessness is said to involve both behavioural-motivational and competence factors (Floor and Rosen, 1975). If this is true, it is apparent that mentally retarded children would be particularly susceptible to helplessness. There are two reasons to consider this group susceptible. First, they have been frequently exposed to failure (Cromwell, 1963; Zigler, 1971). This constant confrontation with failure is similar to the successive failures used by numerous investigators (Diener and Dweck, 1978; Dweck and Repucci, 1973; Hiroto and Seligman, 1975) to induce helplessness experimentally. Second, retarded children may have received heavy doses of helplessness-inducing feedback throughout their school life. When comparing teacher-to-child feedback with non-retarded and retarded subjects of similar reading levels, Raber and Weisz (1978) found that the retarded group received significantly more helplessness-inducing feedback than their non-retarded counterparts. In addition to this, the retarded are continually exposed to the unguarded comments of non-retarded children. These cumulative factors all contribute to developing and reinforcing a feeling of helplessness in the retarded children.

The identification of learned helplessness in retarded children was undertaken by Weisz (1978). Using a system of multiple measures designed to reflect helplessness in subjects, Weisz adapted a crossed IQ and MA design to maximize the generality of the results. Results clearly indicated that retarded children were more helpless at the upper MA level than at the low levels. With regard to this outcome, Weisz (1978:317) states, "this finding is in harmony with the view that retarded children learn helplessness over years of development, and by

extension that successive failure and helplessness-inducing feedback play a causal role."

These results supported the finding of Floor and Rosen (1975), who identified helplessness as being a meaningful personality variable among retarded adults. Using a "Helplessness Test" consisting of five behavioural items and three questionnaires, it was found that the majority of the items discriminated between the retarded and non-retarded subjects. Although there is limited research linking the concept of learned helplessness to mental retardation, it is apparent that the findings support the notion that continual exposure to failure, as experienced by individuals such as the mentally retarded would result in "learned helplessness" increasing over years of development. If helplessness is a pervasive problem among retarded children, then attribution retraining programmes which have been found to be effective would be appropriate in attempting to alleviate the problem.

In summary, a number of studies have been reviewed which have successfully attempted to alter causal attributions and emphasized the role of effort in overcoming difficulties in achievement related situations. The effectiveness of these retraining programmes has been clearly demonstrated and has developed a new approach to the study of learned helplessness.

Summary

Heider's (1958) original work in the area of attribution theory was a formalization of the ways in which a layman might try to understand the behaviour of those around him. Since these early beginnings a wealth of literature and research has been developed utilizing the theory in many contexts, with recent emphasis being directed towards

its educational implications. The attributional explanation of achievement-related behaviour indicated that students differ in their causal perceptions of successes and failures. More importantly, these perceptions have significant influences on academic performances, as has been demonstrated in studies performed by Friend and Neale (1972), Nicholls (1975), Bar-Tal (1978), and King (1979).

The concern in recent research to assist individuals who have been continually faced with failure, has resulted in the linking of the learned helplessness phenomenon with attribution theory. Retraining programmes conducted in studies performed by Dweck (1975), and Andrews and Debus (1978) have demonstrated that learned helplessness can be alleviated by changing the individual's attributions for failure. The established method of identifying causal attributions, together with the emerging concept of "attribution therapy" will form the theoretical basis for this study.

Chapter III

RATIONALE FOR THE STUDY

The primary objective of the study was to test the effectiveness of attribution retraining programmes designed to help children to overcome failure at motor performance tasks. The study compares the potential of these programmes with retarded and non-retarded children matched on mental and chronological age. Two particular training conditions were assessed, an "effort-orientated" procedure and a "performance-based strategy" procedure. Attributional retraining research (Andrews and Debus, 1978; Chapin and Dyck, 1976; Dweck, 1975) has provided an empirical rationale which supports the hypothesis that accepting responsibility for failure is an integral part of the process of learning to solve the problem. The majority of studies completed in this area have been concerned with cognitive tasks related to the academic setting. A search of related literature has failed to reveal any research applying this theoretical framework to the area of motor performance.

By reason of the limited cognitive verbal abilities of the mentally retarded children their motor performance capabilities assume more importance in determining opportunities for social interaction and vocational prospects (Austin, 1968; Gold, 1973; Rarick, 1973). This importance of adequate motor performance made it particularly relevant to use motor tasks as the performance criteria in these studies utilizing attributional theory. In addition, given that recent research

(Raber and Weisz, 1978; Weisz, 1978), has positively identified learned helplessness behaviour in mentally retarded children, the planning of attributional retraining programmes is also very pertinent.

Research has demonstrated that successful experiences in coping with failure have given added confidence and in many instances alleviated the learned helplessness attitude in children. The attributional procedures utilized taught children to accept responsibility for failure by attributing it to insufficient effort. This study has endeavoured to extend Dweck's (1975) research by adding a "strategy" component in addition to the "effort" retraining programme, with the aim of comparing the effectiveness of the two methods in the specific area of motor performance. The necessity for this additional concept has been indicated by Nicholls (1976, 1978) who noted that children soon learn that effort alone is insufficient to improve performance beyond a certain stage. The particular relevance of strategy to motor performance is a further reason for implementing task strategy as another possible means of improving performance for children who feel confident enough to devise and apply a strategy to a problem-solving situation.

Locus of Control as Related to Performance Outcomes

The first study was concerned with assessing the influence that the locus of control personality variable exerts on the motor performance of mentally retarded children in success and failure situations. For the purpose of the study locus of control was defined as the degree to which individuals view the outcome of events as a consequence of their own actions; with internals believing they exert

control over the outcomes, and therefore resisting external reinforcement, while externals are receptive to reinforcement, believing outcomes are beyond their control. This first study was also designed to determine whether the internal or external locus of control categories would be important classifications for grouping subjects in the two subsequent experiments.

The role of reinforcement and rewards has been recognized by social learning theorists as crucial in the acquisition and performance of skills and knowledge. However, the reaction of individuals to reinforcement and outcomes has been found to vary, even in the most carefully controlled experimental conditions. Rotter (1966:1) says that "one of the determinants of this reaction is the degree to which the individual perceives that the reward follows from, or is contingent upon, his own behavior or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions." Lefcourt (1976) cites a series of studies performed with his colleagues (Lefcourt, Lewis and Silverman, 1968; Lefcourt and Siegal, 1970a; Lefcourt and Wine, 1969), which reflected this viewpoint. These studies revealed that internally controlled subjects were unresponsive to the experimenter's manipulations and reinforcements, whereas the externally controlled subjects readily capitulated to all instructions and reinforcement conditions.

It was hypothesized that following positive and negative reinforcement, the response of the educable mentally retarded subjects, categorized as internal or external would correspond to the research evidence as cited by Lefcourt (1976). Accordingly the following predictions were made:

(1) The ILC child, because of his belief in his own control of events would be less influenced by success or failure.

(2) Conversely the ELC child's performance would significantly improve following success and deteriorate following failure as a result of his belief in the ineffectiveness of his control over outcomes.

Attributional Analysis of Achievement Behaviour

Weiner and Kukla (1970), and Kukla (1972) endeavoured to establish the relationship between achievement motivation and the attribution of causality. They demonstrated that persons who differ in their achievement needs and aspirations also differ in their dispositions to ascribe outcomes to any of the four Heiderian attributional variables of ability, effort, task difficulty and luck.

The dearth of published research employing attribution theory with school-age children and more particularly with educable mentally retarded children was the reason for initiating the second study. The aim was to determine if children in the age range of 9-15 were able to competently make attributions for performance outcomes and also to ascertain the differences that may have existed in the causal attributions made by the mentally retarded and non-retarded children.

As a result of their exposure to failure and frequent negative feedback the retarded children were expected to have low aspiration levels and were classified as low achievers (Weisz, 1978). Non-retarded children, who by comparison have experienced considerable success, were expected to have higher levels of aspiration and were classified as intermediate or high achievers. Accordingly the following predictions with regard to their causal attributions were made:

(1) The educable mentally retarded children would respond in

a manner characteristic of the low achiever and attribute failure to lack of ability and success to effort and luck.

(2) Non-retarded children on the other hand would respond as intermediate or high achievers and attribute success to ability and effort and failure to lack of effort.

Overcoming Failure and Alleviating Learned Helplessness

It has been demonstrated that children who are subjected to continual failure will experience a decline in their expectancy of future success (Phares, 1957). In time these children approach all situations with the same negative attitude, believing that continued effort would be wasted in striving for a satisfactory result. The devastating effect of failure reinforces the individual's belief in a lack of ability and when success does occur it is immediately attributed to luck or chance (Weiner and Kukla, 1970). Failure-prone children who refuse to accept responsibility for the consequences of their behaviour become trapped in a self-perpetuating cycle of failure. They view themselves as helpless, which in turn reduces self-esteem and undermines their self-concept. This outcome leads to the development of negative attitudes towards academic situations and ultimately generalizes to influence behaviour in all circumstances (Fitts, 1972). In the last decade experimental research in the area of learned helplessness has simulated the feelings that the failure-prone individual experiences. Learned helplessness has been induced in experimental situations by submitting subjects to unavoidable and uncontrollable adversive conditions, where the outcome was independent of the response (Hiroto, 1974; Klein, Fencil-Morse and Seligman, 1976; Miller and Seligman, 1975). Resulting behavioural effects indicated motivational, cognitive and emotional deficits occurring as a consequence of a perceived lack of

control over outcomes.

It can be asserted that failure-prone children perceive their behaviour as having no impact on the environment and feel powerless to control the outcome of subsequent events (Dweck and Repucci, 1973). Laboratory research has also demonstrated that learned helplessness can be reversed (Seligman and Maier, 1967). According to Brustein (1978:8), "the success of attribution retraining lies in the fact that children were supplied with a strategy to control the traumatic experiences of failure." Although attribution retraining has been successful in short-term experimental conditions, the long-term generalizations have been questioned.

Brustein (1978) has suggested that one-to-one cognitive training would be more beneficial, with the teacher first demonstrating the strategy to be used in solving the perceptual task and the child subsequently performing the task in two stages; first, by verbalizing the process and second, by practicing the problem-solving strategy. In accordance with this recommendation this study has included two training methods; increased effort and performance-based strategies, both designed to teach the child to perform successfully at an initially failed task.

The learned helplessness paradigm has shown that individuals, when subjected to aversive conditions lapse into a state of passive behaviour and eventually cease their efforts to control the situation. From the perspective of learned helplessness theory it was predicted that children who do not experience success in coping with failure would be expected to lapse into helplessness, resulting in a deterioration in performance.

Given that research has shown that teaching children to accept responsibility for failure by attributing it to insufficient effort has led to improved performance in a classroom setting, it was anticipated that this methodology could be successfully applied to the area of motor performance. While effort-attributional procedures have proved successful in recent retraining programmes, in accordance with the cognitive framework of learned helplessness and cognitively-orientated learning, Cullen (1979) has demonstrated that problem-solving strategies have also enabled children to significantly improve their performance on problem-solving tasks. It was felt that performance-based strategies were particularly relevant in the area of motor performance and that their application would provide subjects experiencing failure with an alternative basis for improving performance.

Chapter IV

EXPERIMENT I

The simulation of success and failure conditions has been employed by numerous researchers in their attempts to investigate the performance of educable mentally retarded and non-retarded children on both cognitive and motor tasks (Bailer and Cromwell, 1965; Butterfield and Zigler, 1965; Gardner, 1966; MacMillan, 1969). Results from many of these research projects have been conflicting and researchers have experienced difficulty in explaining the contradictory results that have occurred. A mediating variable which has received recent attention in explaining performance outcomes, is the internal-external locus of control construct. As a personality variable, internal locus of control refers to individuals who have a strong expectancy toward "perception of positive and/or negative events as being a consequence of one's own action and thereby under personal control" (Lefcourt, 1966:207). External locus of control refers to individuals characterized as having a strong expectancy towards "the perception of positive and/or negative events as being unrelated to one's own behaviour in certain situations and therefore beyond personal control" (Lefcourt, 1966:207).

The internal-external locus of control may be a personality variable which could account for the discrepancies in results following success and failure experiences. It was the purpose of this study to determine whether the response of educable mentally retarded boys

following success and failure, was related to the internal-external locus of control factor. Should a significant difference be found between the two groups, the locus of control variable would be utilized as a blocking factor in subsequent studies.

In view of the research evidence that supports the validity of classifying individuals into internal and external locus of control categories, it is predicted that the two groups will differ in their reaction to success and failure outcomes. Accordingly, the following hypotheses were formulated:

> Hypothesis 1. The performance of the ILC child will not be significantly influenced by the outcomes resulting from success or failure treatment conditions.
>
> Hypothesis 2. The ELC child will be significantly influenced by the success and failure outcomes and react positively following success and negatively following failure.

Method

Subjects

Sixty educable mentally retarded boys from a special vocational school, administered by a large Alberta school board, were the subjects for this study. The full scale scores obtained from the Wechsler Intelligence Scale for Children were used to classify the mentally retarded boys. The subjects ranged in age from 13 to 15 years. Any boy who had a chronic medical problem, physical disability, or behavioural difficulty was removed from the sample. A table of random numbers was used to select randomly the six groups of 10 boys to meet the requirements for the experimental design. The means and standard deviations for the MA, CA, and IQ levels for the groups are presented in Table 1.

Table 1

Descriptive Characteristics for the Six Groups of Educable Mentally Retarded Boys

Internal Locus of Control Group (N=30)

	TREATMENT CONDITION					
	Success		Failure		Control	
VARIABLE	Mean	SD	Mean	SD	Mean	SD
Chronological age	13.91	.06	14.00	.05	14.09	.57
Intelligence quotient	72.60	4.80	72.70	4.42	72.32	3.60
Mental age	10.08	.76	10.23	.61	10.15	.74

External Locus of Control Group (N=30)

	TREATMENT CONDITION					
	Success		Failure		Control	
VARIABLE	Mean	SD	Mean	SD	Mean	SD
Chronological age	13.93	.05	14.00	.61	14.50	.62
Intelligence quotient	70.70	4.96	73.80	5.36	73.00	3.34
Mental age	9.86	.96	10.30	.86	10.21	.73

Apparatus and Tasks

Locus of control measure. The Bialer-Cromwell Children's Locus of Control Scale was used to classify children into internal and external categories. This test included 23 questions that were administered orally; each question required a yes or no answer from the subjects. The test was administered individually to the subjects, and every attempt was made to ensure that the subjects completely understood the meaning of the questions. The locus of control instrument is presented in Appendix A.

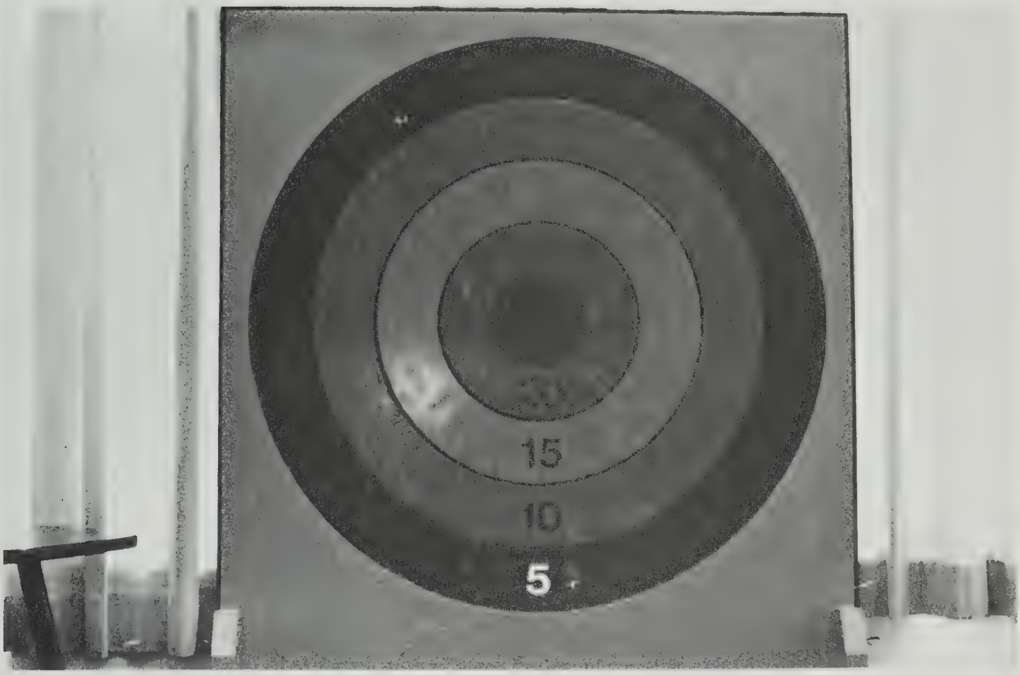
Target throwing task. The dimensions for the target areas were adapted from the apparatus used by Weinberg (1978). Subjects were required to throw a tennis ball at a target with five concentric circles of varying colour. The radius of the inner circle was 6.4 centimetres; all other targets increased in 10.1 centimetre intervals so that the radii were 16.5, 26.6, 36.8, and 46.9 centimetres respectively. The scores for the various target areas were tabulated as follows: 25 points for hitting the red area, 20 points for the orange, 15 points for the yellow, 10 points for the green and 5 points for the blue area, with the largest points being awarded for hitting the smallest area. No points were awarded for hitting the white background area surrounding the target.

The target was placed firmly against a wall and the subjects threw from a distance of five metres. The tennis balls were covered with gymnastic chalk so as to leave a positive mark on the target. The scores were recorded by the experimenter after each trial and were verbalized aloud so as to give feedback to the subjects. An illustration of the apparatus is presented in Plate 1.

Ball rolling task. A modification of Martens' (1970) ball rolling accuracy task was used. This task involved rolling a rubber ball 4.1 centimetres in diameter, with the preferred hand to a target area in the centre of an inclined board. The target board was 1.83 metres long and 45.7 centimetres wide, with borders 5.1 centimetres high. The upper end was raised to a height of 30.5 centimetres. A target area 10.2 centimetres wide extending across the width of the board was located 86.4 centimetres from the front edge. The apparatus had two wooden rails 1.52 metres long and 5.1 centimetres high placed in parallel and continuous with the end of the target board, thus enclosing a pathway from the target board to within 30.5 centimetres of the restraining line. Deviation areas of 5.1 centimetres were marked on the inner and top surfaces of the rails. For scoring purposes the target value was zero, while the areas above the target had positive values of one to 17 and those below the target had negative values of one to 47. In performing the task the subjects assumed a kneeling position behind the restraining line and to the side of the centre division opposite to that of the preferred hand. An illustration of the ball-rolling apparatus is presented in Plate 2.

Experimental Design

A 2 x 3 x 2 factorial design was used in this study. The resulting design consisted of two locus of control classifications, (internal/external), the three treatment conditions (success, failure, control), and pre and post tests, each consisting of three blocks of ten trials. Ten subjects were randomly assigned to each treatment condition. Figure 8 illustrates the three phases of the study, while Table 2 represents a diagrammatical description of the design that was



Target Throwing Apparatus

Plate 1

Ball Rolling Apparatus

Plate 2

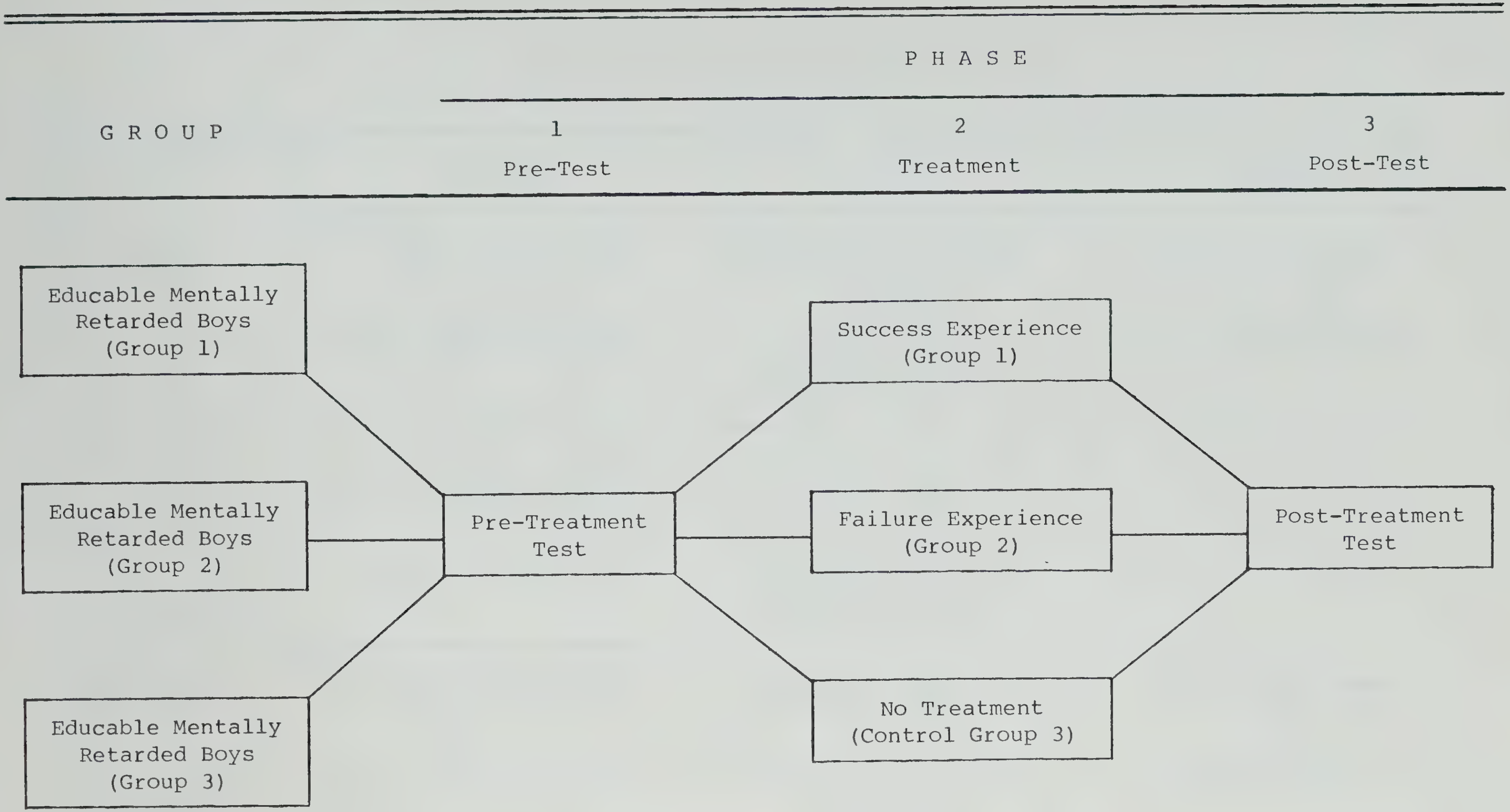


Figure 8. Schematic representation of the research design for experiment I.

Table 2

Research Design for Experiment I

Experimental Group	Pre-Test	Treatment	Post-Test
ILC (N=10)	Ball-rolling Task 3 x 10 trials	Target-throwing Task 4 x 10 trials	Ball-rolling Task 3 x 10 trials
ELC (N=10)	3 x 10 trials (30 second intervals)	4 x 10 trials (30 second intervals)	3 x 10 trials (30 second intervals)
(Group 1)		SUCCESS CONDITION	
ILC (N=10)	Ball-rolling Task 3 x 10 trials	Target-throwing Task 4 x 10 trials	Ball-rolling Task 3 x 10 trials
ELC (N=10)	3 x 10 trials (30 second intervals)	4 x 10 trials (30 second intervals)	3 x 10 trials (30 second intervals)
(Group 2)		FAILURE CONDITION	
ILC (N=10)	Ball-rolling Task 3 x 10 trials	Target-throwing Task 4 x 10 trials	Ball-rolling Task 3 x 10 trials
ELC (N=10)	3 x 10 trials (30 second intervals)	4 x 10 trials (30 second intervals)	3 x 10 trials (30 second intervals)
(Group 3)		NO TREATMENT	

ILC = Internal Locus of Control
ELC = External Locus of Control

used.

Procedures

The subjects performed individually on all tasks. During the walk to the testing room the subject was told that he would be performing a number of skills on new physical education equipment designed to assist boys to improve their throwing ability.

Phase 1: The pre-test phase. This was performed on the ball rolling equipment; prior to the test the subjects were read a brief set of instructions.

> This is a game designed to find out how accurately you can roll a ball up an inclined board, to a target. You are required to roll the ball so that it will stop on this red line, and then roll back to you. This is how you roll the ball. (Three demonstration rolls were performed, one long, one short, and one on or near the target). Now you can have three practices before the test begins. (Subject practices). We will now begin the test, you will be allowed 30 rolls, after each ten rolls you can have a short rest; aim to stop the ball on the red line and roll it up the centre of the board.

Before commencing the testing programme, each subject performed three practice trials on the apparatus and the experimenter monitored the subject's performance to ensure the requirements were clearly understood. During the formal testing session, each subject was required to perform three blocks of 10 trials, endeavouring to roll the ball to the target with as much accuracy as possible.

Phase 2: The treatment phase. The subject progressed to the target throwing task, where the success/failure treatment was simulated. After the experimenter read the following set of instructions, the subject was asked to perform three practice trials.

> In this task you are required to throw the ball at the target; you should try to get as high a score as you possibly can. You can see the different scores marked on the target, note that the

> centre of the target is the highest score. I would like you to have three practice trials, throwing with your preferred hand like this. (Experimenter demonstrates).

At the completion of these trials, questions relating to the task were answered by the experimenter. Prior to the formal testing at the target-throwing task, each boy was given a target score to aim for in order to succeed at the task. This score was manipulated by the experimenter according to the classified treatment group to which the particular boy was assigned. Each boy was told, "This is the score that boys your age usually get in target throwing (score shown). In order to be successful at this task, you must reach this score." After each block of trials the subject's cumulative score was added, and he was informed of the success or failure outcome. Three references to this result were made by the experimenter during the testing session in order to reinforce the treatment conditions.

Phase 3: The post-test phase. The subject returned to the ball rolling apparatus to complete the post-test section of the study. As with the pre-test, three blocks of 10 trials were given and the scores recorded. Following the completion of the testing programme the boys were congratulated on their performance and thanked for their cooperation. An assessment of the treatment was calculated by a comparison of the dependent variable scores obtained in the pre and post-test segments.

Data Analysis

The dependent variable used in this study was the variable error score. Performance scores were summed over the three blocks of 10 trials and pre and post-test performance scores were established.

The data were subjected to a 2 (LOC) x 3 (Treatment Groups) x 2 (Pre-Post) analysis of variance, with repeated measures on the last factor. For this purpose the ANOVAR programme provided by SPSS was used. Planned comparisons were performed to determine the significant differences that occurred between the cell means. The tests of significance that were used in the data analysis were two-tailed.

Results

The major purpose of this study was to determine the effects of differential motivation conditions on the motor performance of internally and externally controlled educable mentally retarded boys. Specifically, the primary purpose was to assess if the treatment programmes of success/failure clearly differentiated between the two groups, thus demonstrating that the locus of control variable was a significant factor in determining motor performance. The first hypothesis that the boys would not be significantly influenced by the outcomes resulting from success or failure treatment, was tested from the performance scores obtained on the ball rolling task.

Table 3 presents the F ratios for the variable error scores that were achieved by both groups on the ball rolling task. While the group effect was not significant, a treatment effect was obtained, $F\ (2, 54) = 4.307$, $p < .02$, and a significant treatment x pre/post test interaction occurred, $F\ (2, 54) = 4.889$, $p < .01$. The means and standard deviations for the variable error scores of the ILC group are presented in Table 4. Figure 9 plots the mean pre and post scores for this group as a function of the treatment conditions.

Table 3

F Ratios for Variable Error Performance Scores

Source	df	MS	F	p
Group (A)	1	235.156	.194	.661
Treatment (B)	2	5,219.277	4.307	.018
AB	2	147.891	.122	.885
Within	54	1,211.895		
Pre-Post (C)	1	838.906	2.982	.090
AC	1	114.414	.407	.526
BC	2	1,375.332	4.889	.011
ABC	2	560.449	1.992	.146
Within	54	281.293		

Table 4

Summary of Means and Standard Deviations of the
Performance Scores for the ILC Group

	Pre-Test		Post-Test	
Treatment	Mean	SD	Mean	SD
Success	43.35	23.12	39.24	26.25
Failure	50.43	26.64	53.53	11.59
Control	30.55	27.42	21.55	15.38

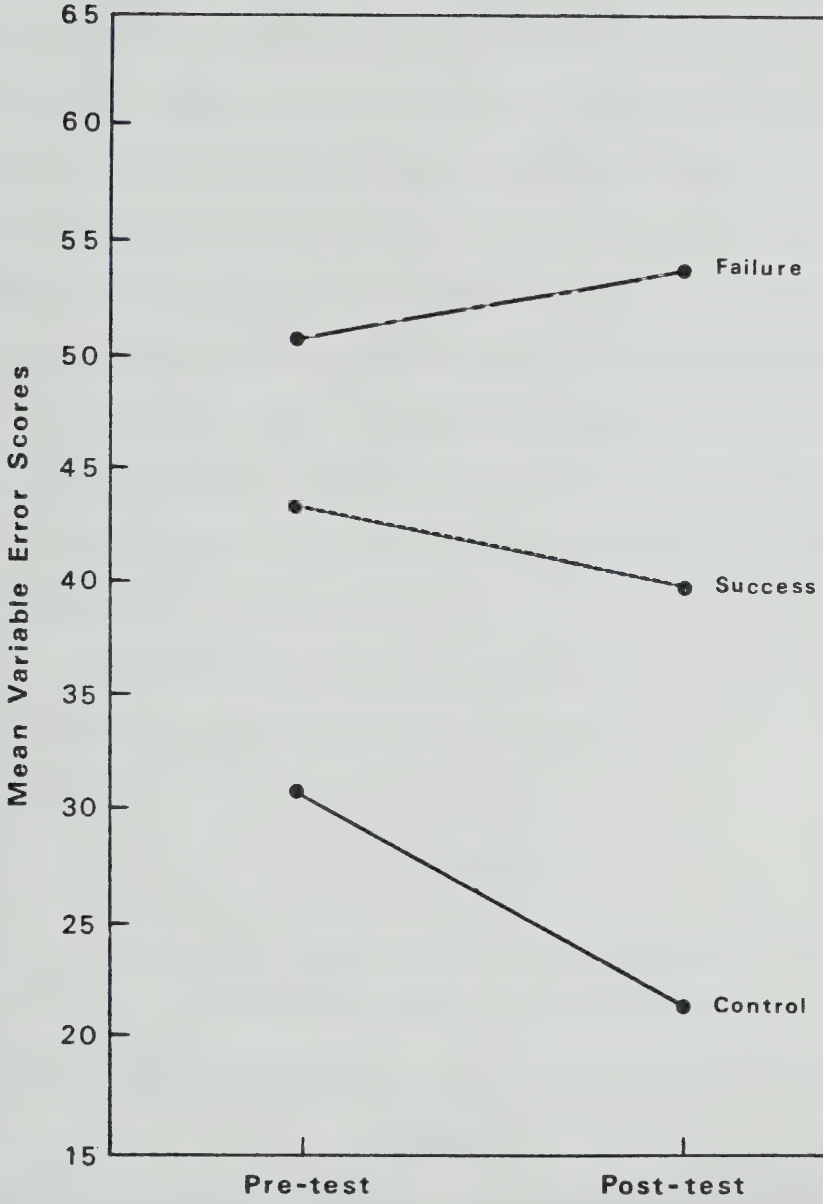


Figure 9. Mean variable error performance scores for the ILC group.

Since the group x treatment x pre/post interaction was seen to approach significance, planned comparisons were performed to investigate the treatment x pre/post interaction for the ILC and ELC groups. When the planned comparisons were applied to the internal locus of control group, no significant differences were found under the three conditions; success, failure or control. These results indicated that the internal locus of control group was not significantly affected by the treatment programmes administered. These results support the first hypothesis, that the ILC group would not be significantly influenced by the success or failure condition, and as a result their performance would not significantly improve or deteriorate accordingly, following the treatment programme.

The means and standard deviations of the variable error scores for the ELC group are presented in Table 5.

Table 5

Summary of Means and Standard Deviations of the Performance Scores for the ELC Group

	Pre-Test		Post-Test	
Treatment	Mean	SD	Mean	SD
Success	53.42	23.92	29.47	8.07
Failure	46.53	30.62	59.51	31.41
Control	44.91	21.82	24.89	19.24

Figure 10 plots the mean pre and post-test scores for this group as a function of the treatment condition.

Planned comparisons were performed on the three treatment groups of pre and post-test scores. No significant treatment effect was obtained for the failure condition. A significant improvement in performance was obtained for the success treatment condition, $\bar{X}$ (PRE) = 53.42; $\bar{X}$ (POST) = 29.47; $F(2, 54) = 3.84$, $p < .05$. From Figure 10, it is evident that a corresponding improvement has also occurred with the control group, planned comparisons have shown this improvement to be marginally significant, $\bar{X}$ (PRE) = 44.91; $\bar{X}$ (POST) = 24.89; $F(2, 54) = 2.68$; $p < .07$. The pre and post-test scores for the success and control conditions were also compared using planned comparison, and no significant difference was found between the two conditions in either the pre and post-test phase. Therefore, the treatment effects did not differentially effect the performance of either the ILC or ELC groups. The significant pre/post difference that has been observed under these conditions could more correctly be attributed to a learning and practice effect that has taken place.

Discussion

Research has established the locus of control variable as a personality factor that exerts influence on behavioural patterns, levels of aspirations and expectancy of future success (Lefcourt, 1975). In this study, the failure of the group main effect and group x treatment x pre/post-test interaction to reach significance, agreed with results obtained in similar studies (involving motor skills and non-retarded

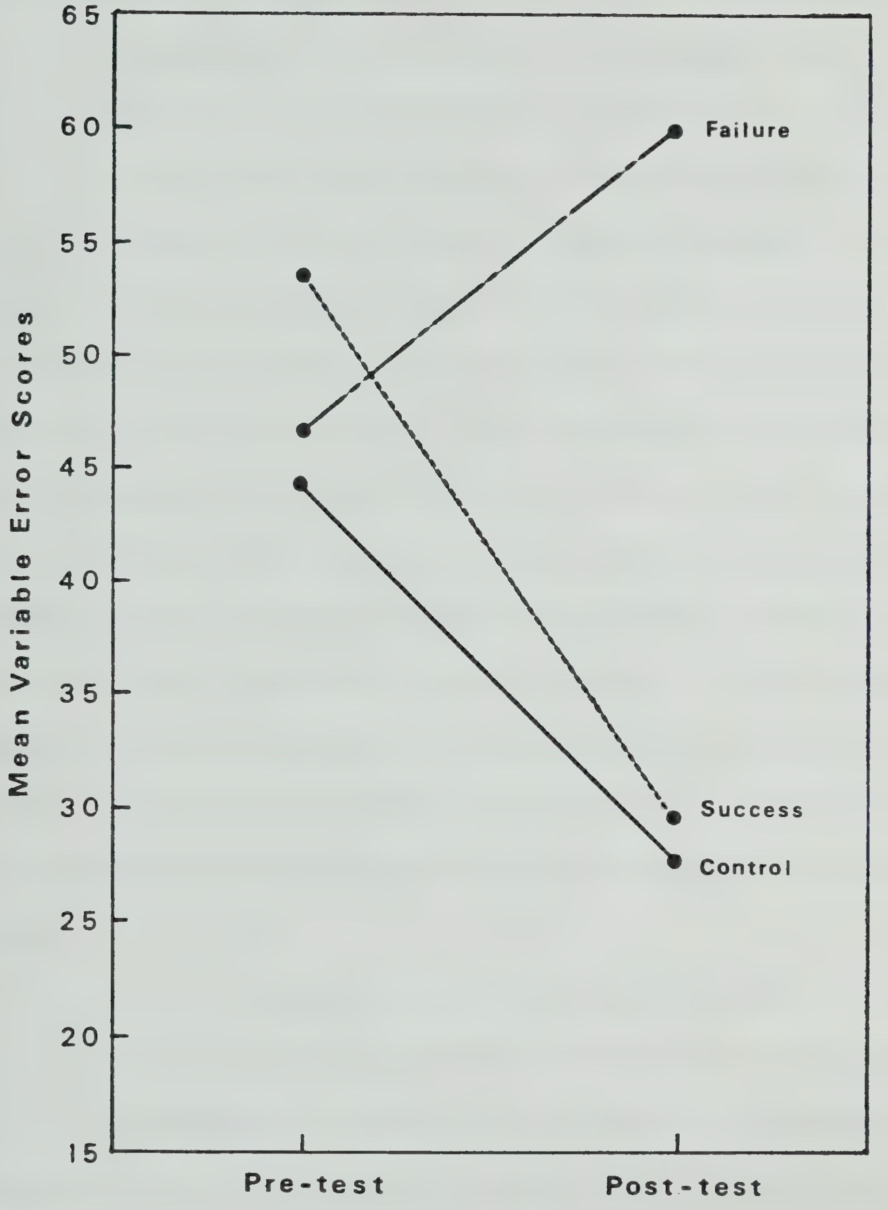


Figure 10. Mean variable error performance scores for the ELC group.

subjects) by McDonald, Tempore and Simmons (1968) and Martens (1971). The consistency of these results would seem to indicate that the locus of control dimension is not related to the response that individuals make following success or failure at a motor task.

In this study results have indicated a difference in the reaction of the two locus of control groups to success feedback. While no significant improvement was found with the ILC group under success conditions, an improvement was noted under both success and control conditions for the ELC group. This improvement would seem to indicate that a learning or practice effect, as distinct from a treatment effect, may have taken place in this particular instance. In the analysis of the failure treatment, the predicted differences in the reaction of the two locus of control groups did not eventuate. The similarity of the responses of the two groups to failure is particularly salient, as the ultimate goal of the series of studies was to design a programme which would assist children to overcome failure on motor tasks.

A possible explanation for the non-significant group x treatment interaction may arise from the particular task situation. When referring to varying responses to a situation by internally and externally controlled subjects, Rotter (1966:2) noted that "one would anticipate that the more clearly and uniformly a situation is labelled as skill or luck determined, the lesser the role that the I-E locus of control personality construct would play in determining individual differences in behaviour." It is postulated then, that the failure of the group factor (ILC/ELC) to interact significantly with the success-failure treatment condition, may have resulted from the situation being

assessed as a skill defined task rather than a luck determined situation.

As with all personality measures the locus of control scale is subject to the testing conditions and the nature of the examinee. In many research situations the questionnaires to measure internal-external control have been found to be inappropriate, and possibly in this study there was a need for a more subtle behavioural measure to be used. The problem of unidimensionality versus multidimensionality also arises, there may be important subscales within the scale which determine more specifically the behavioural expectancies than the unidimensional internal-external divisions.

While endeavouring to explain these results it is also relevant to consider the limited mental abilities of the educable mentally retarded subjects. In the area of personality some tentative support has been obtained for the notion of a success-failure motivational system which develops with mental age (Cromwell, 1965). However, the evidence suggests that qualitative differences occur in reaction to success and failure at different mental age levels, regardless of the intellectual status of the child. The developmental level of the particular subjects chosen for this study may then have been a factor partly responsible for the non-significant group effect.

The heterogeneity that exists within a group of educable mentally retarded subjects is a further factor which may contribute to inconsistent results. Although every effort was made to control the experimental conditions, the experimenter detected wide variation in the manner of the approach and the response of the subjects. This diversity of behaviour may be atrributed to a number of factors beyond the control of the experimenter. These extraneous variables appear to be related

particularly to emotional involvement in situations preceding the testing periods.

When predicting achievement behaviour or performance in achievement situations the problem of obtaining highly accurate and reliable results is always present because of a number of intervening factors which may arise during the experimental conditions. This also applies when attempting to predict behaviour as a function of the internal-external construct. Recent research (Rotter, 1975) has indicated that subjects may verbally express attitudes in one direction on the I-E measures as a defence for expected failure, but in fact react in a contrary direction. Because of the exposure of the mentally retarded subjects used in this study to frequent failure, it is reasonable to surmise that this type of reaction may have occurred in their responses to the Bialer-Cromwell questionnaire. It seems evident that it would be necessary to apply the construct to a much larger sample of retarded boys in order to gain a reliable assessment of the direction of their responses, and to gauge the reliability with which these subjects can be classified as being internally or externally controlled.

The primary aim of this initial study was to assess whether the ILC/ELC construct was a discerning factor under these experimental conditions. In view of the fact that the predicted reaction of the two groups to the two treatments has not been realized, it was decided not to utilize the locus of control variable as a blocking factor. Taking into account the comparative nature of the subsequent experiments, it was decided to follow the chronological and mental age matched design as recommended by Denny (1964) and adapted by Weisz (1978).

Chapter V

EXPERIMENT II

An attributional analysis of achievement behaviour assumes that this behaviour is cognitively mediated by attributions of causality to one or more of the four factors: ability, effort, task difficulty and luck (Weiner *et al.*, 1971; Weiner and Kukla, 1970). Given information, such as success or failure, persons make attributions to the causal elements which may influence subsequent achievement performances. Proponents of the attributional model of motivation posit that the individual may employ all four elements to interpret this outcome in an achievement related situation (Frieze and Weiner, 1971; Feather and Simon, 1971). The majority of research focussing on causal attributions has been performed utilizing cognitive tasks and normal adult subjects. Horai and Guarnaccia (1975) initiated a new direction of research in this area using mentally retarded adult subjects performing cognitive tasks. The authors reported that the subjects made causal ascriptions as a function of success-failure feedback. However, there has been very little research completed which has investigated the potential of applying the attributional model of achievement motivation to facilitate the performance of educable mentally retarded children.

Therefore, it was the purpose of this experiment to determine whether or not the attributional model could be effectively used with educable mentally retarded and non-retarded children and to investigate

the causal attributions they made following success or failure feedback while performing a motor task.

Based on the conceptualization of mentally retarded children being categorized as low achievers and on the previous research findings which have associated particular attribution patterns with achievement levels following success and failure feedback, the following hypotheses were formulated:

> Hypothesis 1. Educable mentally retarded children, compared to the non-retarded, will be more likely to respond in a manner consistent with low achievers and attribute failure outcomes to a lack of ability and success to effort and luck.
>
> Hypothesis 2. The normally achieving children will attribute success to ability and effort, and failure to lack of effort.

Method

Subjects

Sixty boys from a school under the control of a large Alberta school board participated in the study. The sample comprised both educable mentally retarded and non-retarded boys matched on mental and chronological age, and consisted of three groups, each with the following composition: 20 non-retarded boys with a chronological age of 13 - 15 and an IQ of 95 - 110; 20 educable mentally retarded boys with a chronological age of 13 - 15 and an IQ of 65 - 80; and 20 non-retarded boys with a chronological age of 9 - 11 and an IQ of 95 - 110. The full scale scores on the Wechsler Intelligence Scale for Children were used to classify the retarded boys, and the Lorge-Thorndike Intelligence tests were used to classify the two non-retarded groups. Any boy with a chronic medical problem, physical difficulty or behavioural difficulty was removed from the provisional list of subjects. A table

of random numbers was used to assign the boys to the success or failure treatment condition. Descriptive data for both the non-retarded and retarded groups are presented in Table 6.

Table 6

Descriptive Characteristics of Educable Mentally Retarded and Non-Retarded Boys

	EMR (13-15)		NR (9-11)		NR (13-15)	
Variable	Mean	SD	Mean	SD	Mean	SD
Chronological age	13.76	.61	9.44	.91	14.01	.36
Intelligence quotient	68.52	4.50	103.21	6.50	105.31	4.80
Mental age	9.45	.84	9.74	.73	14.75	.75

Apparatus and Tasks

Pursuit rotor task. The apparatus used in this experiment consisted of the following components: (1) Rotary Pursuit (Lafayette Instrument Co. Model No. 20023); (2) a digital electric timer (Lafayette Instrument Co. Model No. 220205a).

The use of this task in motor performance studies with educable mentally retarded subjects has been well documented (Ellis and Sloan, 1957; Barnett and Cantor, 1957; Ellis and Distefano, 1959; Martens, 1970; Levy, 1974). The turntable on the pursuit rotor is 23 centimetres in diameter with a two-centimetre round brass target mounted flush in the surface eight centimetres from the centre. The turntable is

constructed so as to enable the experimenter to adjust the rotation speeds at the following callibrations; 15 rpm., 30 rpm., 45 rpm., and 60 rpm. An illustration of this equipment can be seen in Plate 3.

Before this experiment was undertaken a small pilot study was performed to ascertain the most suitable speed that should be used for the EMR and normal children. The results indicated that 30 rpm made it possible for the experimenter to adequately simulate conditions of success and failure. Automatic switching provided alternative rest and activity periods, and an electric bell five seconds before each trial sounded a warning to the subjects to be prepared for the next trial. The stylus consisted of a lucite handle eight centimetres long and a 13 centimetre brass rod which is bent at an angle of 90 degrees two centimetres from the tip. A hinge joining the rod and the handle permits vertical flexion. The time is calibrated in .001 seconds and registers the "time on target" score. The complete apparatus is mounted on a table 66 centimetres in height.

The task objective for the subject was to maintain contact between the stylus and the brass button for as long as possible. This time was automatically recorded. During the task the boys were subjected to success or failure treatment conditions, this was controlled and simulated by the experimenter. The treatment feedback was given in the form of a red light (failure) and a green light (success).

In addition, the experimenter compared the achieved score with the criterion score and verbally informed the subject of the success or failure outcome.

Attribution measuring instrument. Because educable mentally retarded boys were included in the sample, there was a necessity for

the tasks and instruments used to be structured so as to maintain the interest of the children. An endeavour was therefore made throughout the study to avoid the extensive use of pencil and paper type assessments. During this experiment the subjects were required to indicate causal attributions for their performances. The instrument used was a simplified variation of that used by Nicholls (1975). An illustration of the equipment may be seen in Plate 4. Referred to as an "Attribution Box," it consisted of two rectangular boxes which encased four half discs. One side of the box was labelled, "I failed because. . ." and the other side was labelled, "I succeeded because. . . ." The four half discs were differently coloured and were entitled respectively: ability, effort, task difficulty and luck, representing the four causal attributions originally formulated by Heider (1958). While the subjects were being shown how to use the equipment, the experimenter carefully explained the meaning of the four causal factors with relevant examples.

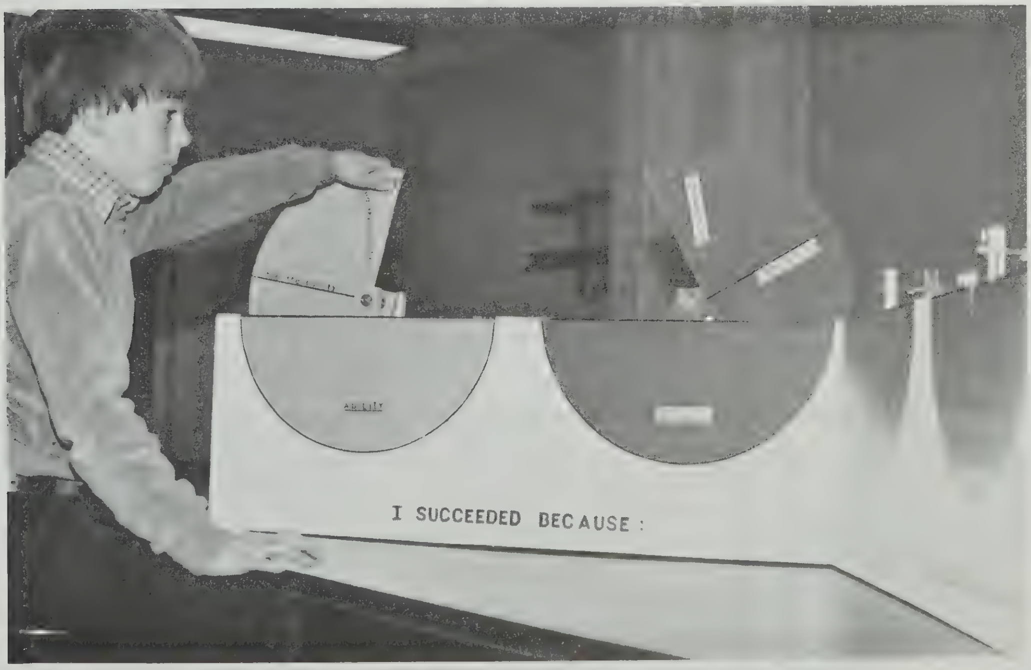
Each of the causality factor discs had five equal sectors graduated on either side in the form of a Likert-type scale. In addition to the written description, each sector was numbered 1, 2, 3, 4, and 5 in order to assist the educable mentally retarded child to attribute the importance of each factor. After each block of three trials, the subjects were asked to think carefully about why they succeeded or failed and to indicate the degree to which they felt each of the causality factors attributed to the resultant outcome.

Experimental Design

The two phases of the study are illustrated in Figure 11, and a diagrammatical description of the design used is presented in Table 7.

Pursuit Rotor Apparatus

Plate 3



The Attribution Box

Plate 4

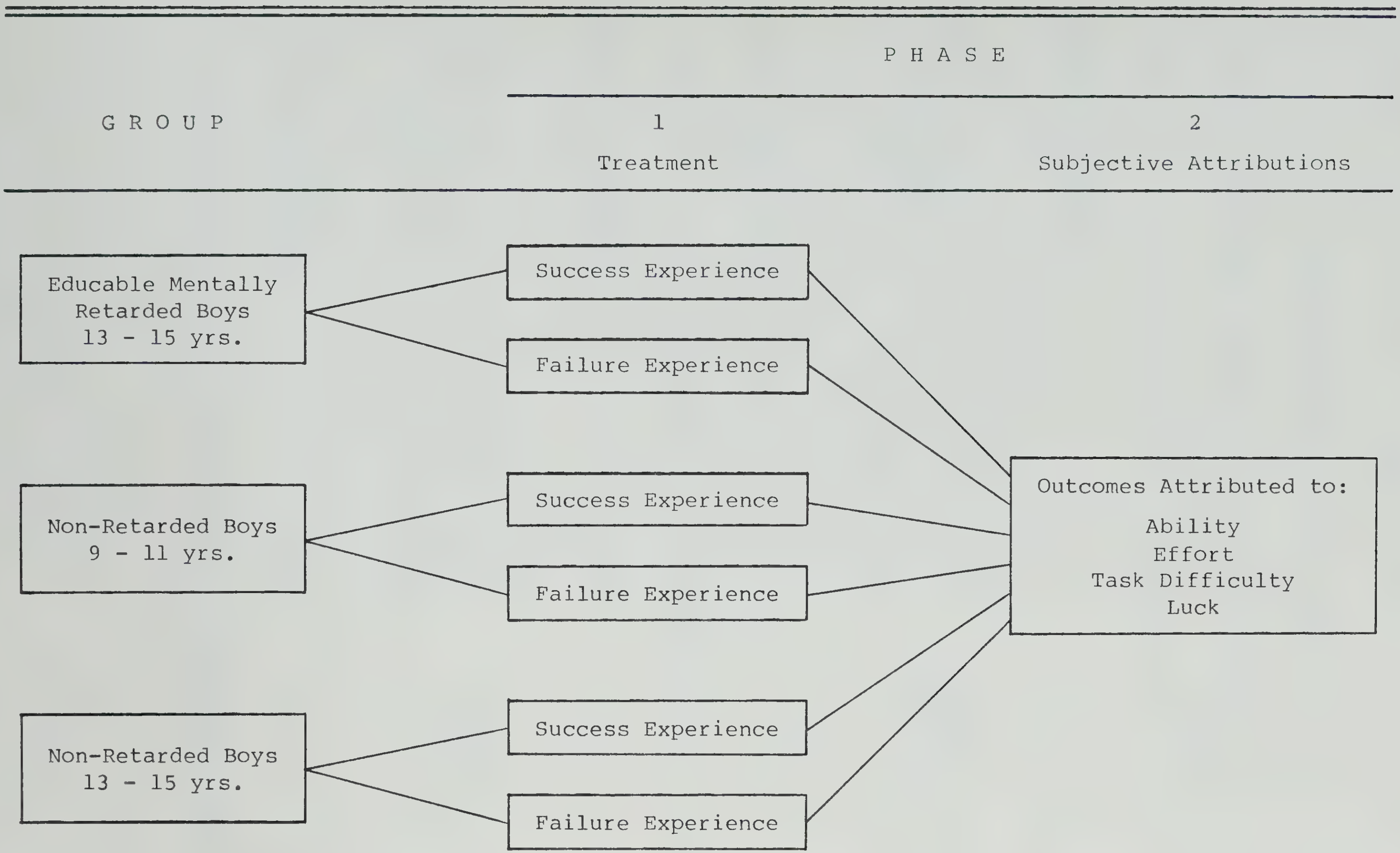


Figure 11. Schematic representation of the research design for experiment II.

Table 7

Research Design for Experiment II

Group	Treatment	Achievement Analysis
Non-retarded Boys CA 9-11, IQ 100-110 (N=10) Educable Mentally Retarded Boys CA 13-15, IQ 65-80 (N=10) Non-retarded Boys CA 13-15, IQ 100-110 (N=10)	<u>Success Condition</u> Pursuit Rotor 4 x 3 trials (2 minute intervals) Success Feedback	Outcomes attributed to ability, effort, task difficulty and luck.
Non-retarded Boys CA 9-11, IQ 100-110 (N=10) Educable Mentally Retarded Boys CA 13-15, IQ 65-80 (N=10) Non-retarded Boys CA 13-15, IQ 100-110 (N=10)	<u>Failure Condition</u> Pursuit Rotor 4 x 3 trials (2 minute intervals) Failure Feedback	Outcomes attributed to ability, effort, task difficulty and luck.

Each of the three groups was randomly assigned to one of the two treatment conditions, with 10 subjects in each cell. The resulting experimental design was a 3 x 2 factorial design, with the first factor representing the three groups and the second factor the two treatment conditions.

Procedure

Upon their arrival in the testing room each subject was seated comfortably on an adjustable chair in front of the apparatus. Prior to the formal testing programme each subject was read the following instructions:

> This is a machine which measures how well you can move your hands and arms. Here is what you should try and do. See this spot and this pointer, when the spot begins to turn try and keep the pointer on the spot. (The task is demonstrated). Here is the score which shows how many seconds I kept the pointer on the spot. (The subject is shown the time on the digital clock). I would now like you to perform three practice trials for me.

The trials were carefully monitored and questions arising from the practice were answered. The subject's attention then focussed on the "Attribution Box" and the following instructions read:

> This is an instrument which will allow you to show me why you feel you succeeded or failed on the pursuit rotor task. These are the four reasons that people usually give when they succeed or fail. (The experimenter points to each of the four causality factors and gives a brief explanation of what each means). When you have finished your turn on the pursuit rotor I want you to move these discs like this, to show me how important you feel each of the factors are to the result you achieved. (At this stage the experimenter simulated a failure condition on himself and demonstrated how to use the discs. The subject was then given a simulated success and failure condition and the result was monitored to see that the requirements were clearly understood).

When the experimenter was satisfied that the subject clearly understood the procedures, the testing programme with the success/failure treatment was commenced with the reading of the following instructions:

> I would now like you to perform four sets of three trials for me. The score boys your age usually get on this task is. . . . If you can achieve that score you will have succeeded, if you get below that score you will have failed. Place the pointer on the spot and prepare for the first trials.

The outcome is manipulated according to the treatment being administered. When the set of trials was finished the subject was told, "You have succeeded/failed, I want you to use the discs to show me why you feel this happened." The subject was given time to indicate the attributions and then prepared for the successive sets of trials in a similar manner. Those boys who were given failure feedback were given additional trials after experimental procedures were completed in order to alleviate any anxiety or negative effects that may have been induced.

Data Analysis

Four two-way (group x condition) analyses of variance were carried out on the attributional factors: ability, effort, task difficulty and luck. The two hypotheses were tested by planned contrasts of the retarded and non-retarded groups for the success and failure treatment conditions. Tests for simple main effects and interactions were performed to indicate significant differences which occurred in attributions for success and failure outcomes within groups. For the purpose of the analysis the subject's attributional score for each factor was summed over the four sets of trials. The data were submitted to a two-way analysis of variance programme.

Results

Table 8 presents the F ratios for the mean attribution scores of the two causality factors, ability and effort. Table 9 presents the

Table 8

F Ratios for Ability and Effort Attribution Scores

Source	df	MS	F	p
<u>Ability</u>				
Group (A)	2	6.720	.771	.467
Treatment (B)	1	6.019	.691	.409
AB	2	605.314	69.531	.001
Within	54	8.705		
<u>Effort</u>				
Group (A)	2	285.300	37.84	.001
Treatment (B)	1	661.660	79.78	.001
AB	2	35.517	4.71	.010
Within	54	7.540		

Table 9

F Ratios for Task Difficulty and Luck Attribution Scores

Source	df	MS	F	p
<u>Task Difficulty</u>				
Group (A)	2	177.92	14.160	.001
Treatment (B)	1	686.81	54.670	.001
AB	2	5.61	.446	.641
Within	54	12.56		
<u>Luck</u>				
Group (A)	2	85.71	10.710	.001
Treatment (B)	1	17.06	2.130	.140
AB	2	256.31	32.050	.001
Within	54	7.99		

F ratios for the mean attribution scores of the two causality factors, task difficulty and luck. The means and standard deviations for the success and failure treatment conditions are presented in Table 10. In Figure 12, the mean attribution scores for the three groups are plotted as a function of the treatment conditions.

Success Feedback

Results indicate that the educable mentally retarded group have attributed their success predominantly to the causality factors of effort and luck. The two non-retarded groups have also attributed success to effort, while the older non-retarded group has also ascribed ability as being an important factor. For success conditions the analysis performed on each of the causality factors has revealed the following significant differences between the retarded and non-retarded groups. On the ability factor a significant group x treatment interaction was obtained, $F\ (2, 54) = 69.53$; $p < .01$. The planned contrasts performed on the three groups revealed significant differences between all pairs of groups. The largest significant difference was revealed between the mentally retarded and the older non-retarded groups, $\bar{X}$ (EMR) = 5.6; $\bar{X}$ (NR 13-15) = 17.2; $F\ (1, 54) = 77.33$, $p < .01$. A significant difference was also revealed between the two non-retarded groups, $\bar{X}$ (NR 9-11) = 9.3; $\bar{X}$ (NR 13-15) = 17.2; $F\ (1, 54) = 35.86$, $p < .01$. These results reflect the extent to which normal achievers attribute success to ability and conversely indicates how the low achievers have extreme doubt about the effectiveness of their own ability. A significant group x treatment interaction was obtained, for effort $F\ (2,54) = 4.710$, $p < .05$. Planned contrasts have shown that a significant difference existed

Table 10

Means and Standard Deviations for Attribution Scores
Following Success and Failure Feedback

	SUCCESS CONDITION							
	Ability		Effort		Task Difficulty		Luck	
AGE GROUP	Mean	SD	Mean	SD	Mean	SD	Mean	SD
9-11 (NORMAL)	9.30	1.49	17.30	1.63	9.50	2.17	4.60	3.06
13-15 (EMR)	5.60	2.71	13.30	1.17	6.30	3.33	13.00	3.01
13-15 (NORMAL)	17.20	2.82	18.81	1.87	4.40	1.82	2.40	2.45
	FAILURE CONDITION							
	Ability		Effort		Task Difficulty		Luck	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
9-11 (NORMAL)	10.40	2.22	9.00	2.00	17.40	2.01	7.00	2.00
13-15 (EMR)	15.00	1.02	5.90	1.29	12.11	2.51	3.70	2.38
13-15 (NORMAL)	4.80	1.38	15.50	2.21	11.00	3.97	6.10	3.68

between the non-retarded and mentally retarded groups. Significant differences between the groups matched on chronological age was noted, $\overline{X}$ (EMR) = 13.3; $\overline{X}$ (NR 13-15) = 18.8; F (1, 54) = 20.05, p < .001.

A significant group x treatment interaction was evident for the causality variable luck, F (2, 54) = 32.05, p < .001. A main effect was also indicated with the mentally retarded subjects strongly

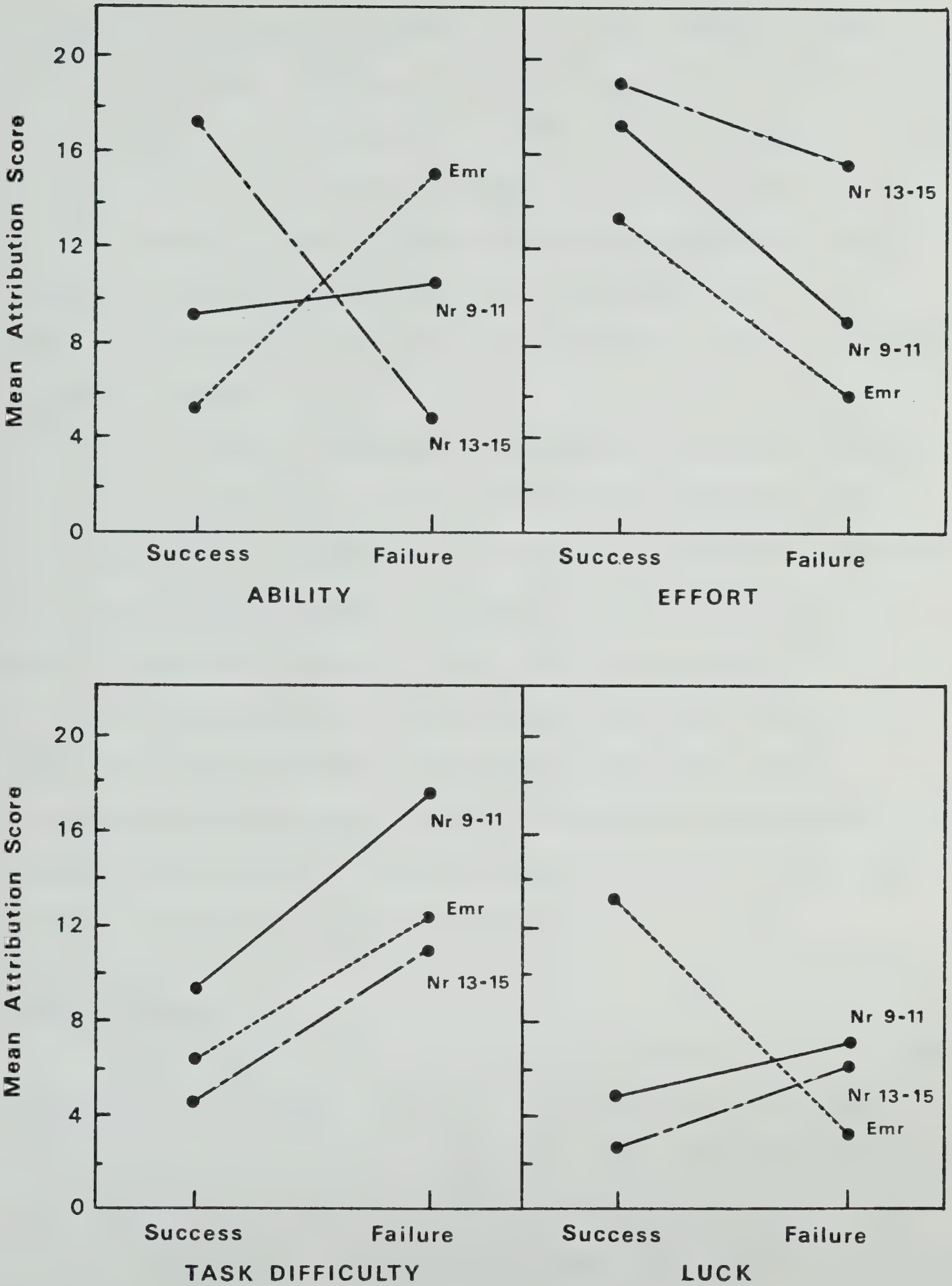


Figure 12. Mean attribution scores as a function of success and failure conditions.

attributing the successful outcomes to luck. The planned contrasts revealed significant differences between the educable mentally retarded group and both non-retarded groups, $\overline{X}$ (EMR) = 13.0; $\overline{X}$ (NR 13-15) = 2.4; $F\ (1,\ 54) = 70.21$, $p < .001$, and $\overline{X}$ (EMR) = 13.0; $\overline{X}$ (NR 9-11) = 4.6; $F\ (1,\ 54) = 44.15$, $p < .001$. There were no significant differences between the two non-retarded groups. Task difficulty has not been emphasized by the three groups as being an important factor causing the successful outcome.

The results have indicated that specific differences do exist in the causal attributions that non-retarded and educable mentally retarded boys make for successful outcomes. The significant differences in attributions made by these contrasting groups is revealed in the mean score plotted in Figure 12, where the trend is clearly indicated. It is evident from these results that the retarded group have made attributions in a manner that is consistent with low achievers, attributing success to effort and luck; while the two non-retarded groups have responded as normal or high achievers by considering effort and ability to be major determinants for success.

Failure Feedback

The educable mentally retarded group attributed failure to lack of ability and difficulty of the task. The two non-retarded groups differ in the causal attributions they have made. The younger group (9-11) have indicated that they considered failure occurred as a result of the difficulty of the task, while the older non-retarded group (13-15) attributed failure to a lack of effort. The tendency for high achievers to attribute failure to the internal factor of inappropriate or

insufficient effort was also noted in research performed by Kukla (1972), Kun and Weiner (1973). Nicholls (1979) has noted the tendency for the younger subjects to make the automatic response that "the task is too difficult," when giving reasons for failure. Similar findings were reported by Cullen (1979), when she recorded spontaneous replies by subjects aged 9-10 who failed to complete puzzle solving tasks in the specific time allotted.

Planned comparisons performed for the groups on the four causal attributes under failure conditions revealed the following variations. Significant differences in the ascriptions made to the ability factor were found between the educable mentally retarded group and the two non-retarded groups, $\bar{X}$ (EMR) = 15.0; $\bar{X}$ (NR 13-15) = 4.8; $F(1, 54) = 59.78$, $p < .01$, and $\bar{X}$ (EMR) = 15.0; $\bar{X}$ (NR 9-11) = 10.4; $F(1, 54) = 12.6$, $p < .05$. These results support the findings by Weiner and Kukla (1970).

The mentally retarded boys have again responded in a manner that is characteristic of low achievers, that is, they viewed failure as a direct reflection of their lack of ability. By comparison the non-retarded groups responded by indicating that personal ability was not a significant causal factor related to the failure outcome. This result supports the findings of previous attributional studies performed with normal and high achieving groups (Kukla, 1972). The tendency for the high achiever to confidently believe that failure can be overcome was reflected in the attribution scores on the effort factor. A significant difference was noted between the retarded and non-retarded group matched on chronological age, $\bar{X}$ (NR 13-15) = 15.50; $\bar{X}$ (EMR) = 5.9; $F(1, 54) = 61.11$, $p < .001$. The causal attributions made to

ability and effort for failure outcomes highlights the significant differences that exist between high and low achievers, and corresponds to research findings reported by Weiner *et al.* (1971), Kukla (1972), and Smith (1977).

Finally, Figure 12 indicates the ascriptions made to luck. The only significant difference exists between the mental age matched groups, $\bar{X}$ (NR 9-11) = 7.00; $\bar{X}$ (EMR) = 3.7; $F\ (1, 54) = 6.81$, $p < .05$. The low mean scores indicate that all three groups determined that luck was not a dominant causality factor in failure outcome.

Comparisons of Attributions for Success and Failure Outcome

Tests for simple main effects were performed to determine whether the groups were significantly different in the importance they attached to each causality factor as a function of performance outcome. The results for each of the four factors were as follows.

Ability. Significant treatment effect differences were revealed on the ability factor in ascriptions made by the retarded group and the older non-retarded group (13-15). The retarded group's results indicated a strong attribution of ability to failure, $\bar{X}$ (failure) = 15; $\bar{X}$ (success) = 5.6; $F\ (1, 54) = 54.78$, $p < .001$, while for the non-retarded group, ability was an important causal factor for success, $\bar{X}$ (failure) = 4.8; $\bar{X}$ (success) = 17.2; $F\ (1, 54) = 88.3$, $p < .001$. The younger non-retarded group indicated ability as being of equal importance to success or failure outcomes.

Effort. It was shown in the results that each of the three groups placed different emphasis on the ascribed importance of effort for performance outcomes. Simple main effects tests for the mentally

retarded group revealed the following differences: $\bar{X}$ (failure) = 5.70; $\bar{X}$ (success) = 10.30; $F (1, 54) = 36.51$, $p < .001$. For the younger non-retarded group the significant differences revealed were: $\bar{X}$ (failure) = 9.0; $\bar{X}$ (success) = 17.30; $F (1, 54) = 45.68$, $p < .001$, and for the older non-retarded group, $\bar{X}$ (failure) = 15.5; $\bar{X}$ (success) = 18.8; $F (1, 54) = 7.50$, $p < .01$.

Task difficulty. Significant differences in ascriptions to task difficulty for success and failure outcomes were revealed for all three groups. Results indicated that groups believed that task difficulty to be an important cause of failure outcomes; however, for successful outcomes, this factor did not appear to be considered a significant factor. The significant differences as a function of performance outcome for the three groups are shown by the following results; for the educable mentally retarded group, $\bar{X}$ (failure) = 12.10; $\bar{X}$ (success) = 6.30; $F (1, 54) = 13.39$, $p < .001$, for the non-retarded group (9-11), $\bar{X}$ (failure) = 17.40; $\bar{X}$ (success) = 9.50; $F (1, 54) = 24.84$, $p < .001$, and the non-retarded group (13-15), $\bar{X}$ (failure) = 11.0; $\bar{X}$ (success) = 4.4; $F (1, 54) = 16.11$, $p < .01$.

Luck. The relative importance that the subjects attached to the causal factor, luck, is revealed in the mean scores shown in Table 10. Simple main effects tests revealed that the only significant difference in the importance attributed to luck as a determinant of performance outcome exists with the mentally retarded group. This group has characteristically attributed luck as an important determinant of success; $\bar{X}$ (failure) = 3.70; $\bar{X}$ (success) = 13.1; $F (1, 54) = 54.12$, $p < .001$.

Discussion

The initial purpose of this experiment was to determine whether or not the attributional model could be effectively used with educable mentally retarded children. Recent research by Nicholls (1978, 1979) had shown the effectiveness of the attributional model with normal achieving children in the age range of nine to 15; however, there was no evidence in the literature to suggest that it could be adapted satisfactorily for retarded children. Results gained in this study have shown that the retarded children are capable of making attributions utilizing the mechanical apparatus devised for this experiment. Not surprisingly, it was noted throughout the testing sessions that more time had to be given to each retarded subject while attributions were being made and the necessity for the experimenter to assist with careful explanations was also evident. In addition to the attributions made by the retarded subjects, the effectiveness of the treatments (success/failure) was indicated by their spontaneous facial expressions, attitudes, and responses. The intensity of these reactions made it imperative that a post-test treatment be administered in order to alleviate anxiety resulting from the treatment.

The results indicated that the mentally retarded subjects were able to make causal attributions, and that the groups differentiated in the attributions that were made for the varying outcomes. The <u>first hypothesis</u>, that educable mentally retarded children would attribute failure primarily to lack of ability and success to effort and luck received support from the attribution data. This hypothesis was formulated in the belief that the retarded subjects would perform in a manner characteristic of low achievers. The results gained are

contrary to a number of research findings. Horai and Guarnaccia (1975) who used trainable mentally retarded adult subjects found that the attributional responses made were consistent with high achievers. Freize and Weiner (1971) and Luginbuhl et al. (1975) have also reported research findings which do not correspond to the achievement levels of the subjects. They have designated these ascriptions to be defensive or self enhancing behaviour. However, research performed by Dweck and Reppucci (1973) indicated that the low achieving subjects took less personal responsibility for success than they did for failure. The results of this experiment coincide with their findings.

The older non-retarded group attributed success to ability and effort while failure was predominantly ascribed to a lack of effort and to a lesser extent, task difficulty. These results have partially supported the second hypothesis. Previous research has indicated that the normal or high achiever does not usually attribute failure to task difficulty. Smith (1977:5) cited research which points to the high achiever feeling generally in control of the situation, responsible for his own success, and believing task difficulty to be an external factor that may or may not be controllable. By attributing failure to a lack of effort, the high achiever implies that provided the outcome is highly valued, an increase in effort will permit the goal to be achieved. There were minor differences in the causal attributions for success and failure outcomes made by the younger non-retarded group. These differences have been revealed in the analysis of the data and refer particularly to the causality factors ability and effort. Nicholls (1979) reported similar findings. He reported that younger children are unable to perceive the various levels of ability and have difficulty in differen-

tiating between ability and effort. Results have shown that they primarily refer to the outcome as being caused by "the effort being made."

From these results it was apparent that attributionally based studies are pertinent to both retarded and non-retarded children. On the basis of the outcomes of experiment II, a third experiment was prepared, with two main purposes. First, to determine whether the alteration of a child's perception of the relationship between his behaviour and the occurrence of failure (i.e. his attributions for failure) would result in a change in his maladaptive response to failure in an experimental situation. Second, to investigate the effectiveness of performance-based strategies, designed to assist subjects to successfully perform an initially failed task. The utilization of strategy is supported by the research of Nicholls (1978), who pointed out that children eventually learn that effort alone is an insufficient prerequisite for success and therefore additional procedures should be integrated. The need for effort to be explicated both in direction (where to place the emphasis) and strategy (what to do in specific situations) becomes an important issue.

Chapter VI

EXPERIMENT III

The purpose of this study was to assess the effectiveness of two training conditions in alleviating the feeling of learned helplessness, and thereby assist retarded and non-retarded boys in coping with failure while performing a motor task. Research performed by Dweck (1975) on the role of attributions in the alleviation of learned helplessness found that students who formerly showed a marked performance deterioration when they failed, demonstrated a decisive improvement in their performance following an attribution retraining programme. This paradigm was reworked by Chapin and Dyck (1976), and similar results were obtained with regard to the progress made following retraining. Andrews and Debus (1978) have also suggested that appropriate achievement-enhancing attributions may be relatively simple to establish by systematic reinforcement and may facilitate on-going achievement activities. In the studies cited the authors have reported that the subjects' performance has been stimulated by simply asking them to "make more effort" or "to try harder." Although such instructions have been shown to improve performance, they would appear to have the disadvantage of lacking guidance, direction and specificity in the particular task.

Further advancements towards successful training methods have been made in recent research by Cullen (1979). She investigated the effectiveness of two training conditions, tutor assisted and self-instructional, utilizing performance-based strategies to train children

to perform successfully on an initially failed cognitive task. Although the training was only undertaken for a limited period, a significant improvement was noted in the students' performance. In the present study, both the attribution retraining and performance-based strategy programmes were employed to provide a comparison of the effectiveness of the two methods in improving the reciprocal tapping performance.

In view of the fact that the performance of the helpless child tends to deteriorate in the face of failure, the purpose of the attribution retraining programme was to alter the individual's perception of the relationship between his behaviour and the failure outcome. Whereas the mentally retarded child has been accustomed to attributing failure to the lack of ability (a stable factor), the retraining programme was designed to teach the child to accept responsibility for failure by attributing it to insufficient effort (an unstable factor).

The second treatment comprised a strategy programme designed to assist subjects to overcome failure by referral to a number of strategic cues. These cues were established by the experimenter and were specifically related to the motor task being performed. The aim of this strategy programme was to teach the subject to adopt a planned approach in coping with failure while performing a motor task.

Research by Dweck (1975), and Chapin and Dyck (1976) has indicated that the attribution retraining methods have been successful in alleviating learned helplessness and thereby improving performance. However, it was believed that a training programme involving the teaching of performance-based strategies would be more advantageous, as it gave direction and specificity to the particular task being undertaken.

In endeavouring to answer the following questions, this study

compared the effectiveness of an attribution retraining programme and a strategy programme, while using non-retarded and retarded subjects in an experimental situation with failure and non-failure post-test conditions.

1. Does the strategy training programme differentially improve the reciprocal tapping performance of the retarded and non-retarded boys under post-test conditions of failure and non-failure?

2. Does the attribution retraining programme differentially improve the reciprocal tapping performance of the retarded and non-retarded boys under post-test conditions of failure and non-failure?

3. Is the strategy training programme more effective than the attribution retraining programme, in improving the reciprocal tapping performance of the retarded and non-retarded boys?

4. Do the mental age matched non-retarded boys reciprocally tap better than their mentally retarded counterparts?

5. Do the chronological age matched non-retarded boys reciprocally tap better than their mentally retarded counterparts?

Method

Subjects

One hundred and eighty boys from two schools under the control of the Edmonton Public School Board and a school controlled by the Westlock Education Division participated in the study. The sample comprised both educable mentally retarded and non-retarded boys matched on mental and chronological age, and consisted of three groups divided into the following categories: 60 boys classified as educable mentally retarded, with a chronological age of 13-15 and an IQ of 65-80; 60 non-retarded boys with a chronological age of 9-11 and an IQ of 95-110;

and 60 non-retarded boys with a chronological age of 13-15 and an IQ of 90-110. The full scale scores on the Wechsler Intelligence Scale for Children were used to classify retarded and older non-retarded groups. The Lorge-Thorndike Intelligence Tests were used to classify the younger group of non-retarded boys. Any boy with a chronic medical problem, physical disability or behavioural difficulty was removed from the provisional list of subjects. A table of random numbers was used to randomly assign the boys to six groups of 10 from each age group. Descriptive data for both the non-retarded and retarded groups are presented in Table 11.

Table 11

Descriptive Characteristics of the Educable Mentally Retarded and Non-Retarded Boys

	EMR (13-15)		NR (9-11)		NR (13-15)	
Variable	Mean	SD	Mean	SD	Mean	SD
Chronological age	14.33	.65	10.82	.53	13.55	.55
Intelligence quotient	72.46	4.76	98.65	8.24	102.48	7.78
Mental age	10.33	.82	9.66	.99	13.84	1.09

Apparatus and Tasks

Pursuit rotor task. This apparatus was identical to that used in experiment II.

Reciprocal tapping task. This task was a modification of the original Fitt's tapping task. It was restructured and utilized for research purposes in a study performed by Wall (1978). The complete equipment is illustrated in Plates 5 and 6. For the purpose of testing, the equipment was located on a solid table at a height of 90 centimetres above the floor. An adjustable chair was used to ensure that each subject was seated comfortably in front of the apparatus. The width of the target plates remained constant at 1.30 centimetres, with the distance between the two being 20 centimetres.

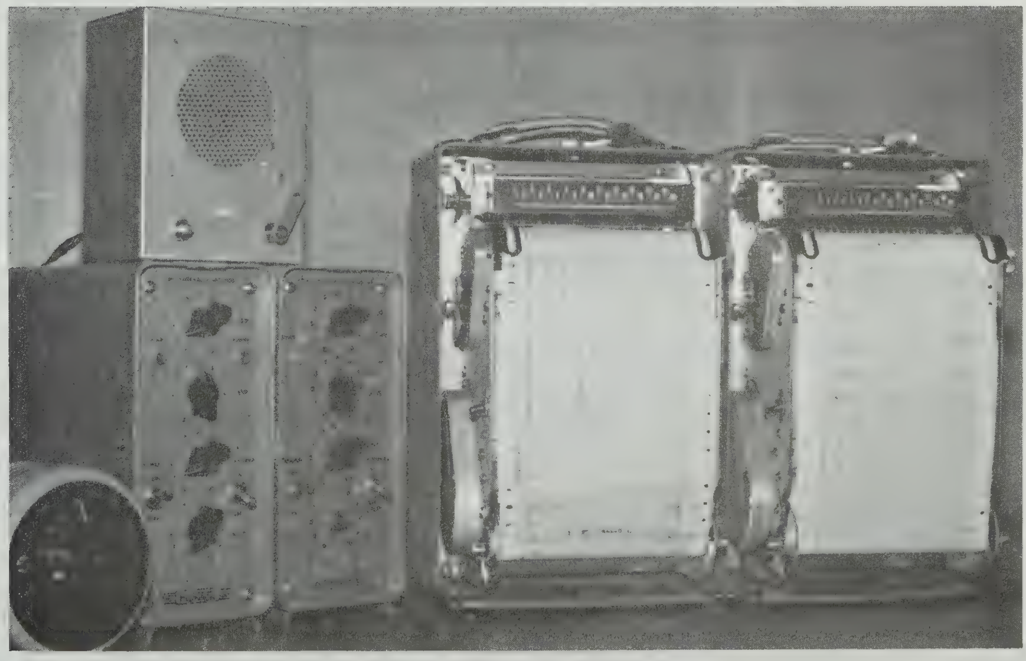
Situated on each side of the target plates were eight 6.5 millimetre brass error plates. The target and error plates were separated by extremely thin non-conducting plastic sheets cut to fit exactly between the plates so as to ensure a smooth tapping surface. The target, error and centre filler plates were held firmly in place by a constricting steel frame.

The tapping apparatus was supported on wooden base, 1.5 x 20 x 50 centimetres which prevented any movement during the performance. A brown vinyl cover, 36 x 90 centimetres, with a window cut to expose the target and error plates was used to mask the constricting frame of the apparatus. A wooden shield placed in front of the tapping apparatus eliminated the possibility of the subject being distracted by the electrical and recording apparatus.

The subjects performed the reciprocal tapping with a 20 centimetre stylus (resembling a pencil), consisting of a solid brass rod pointed at one end, and insulated within a 6.5 millimetre wooden dowel. The tapping stylus had a light wire connecting it to a common lead which completed a circuit from a specific target or error plate to a

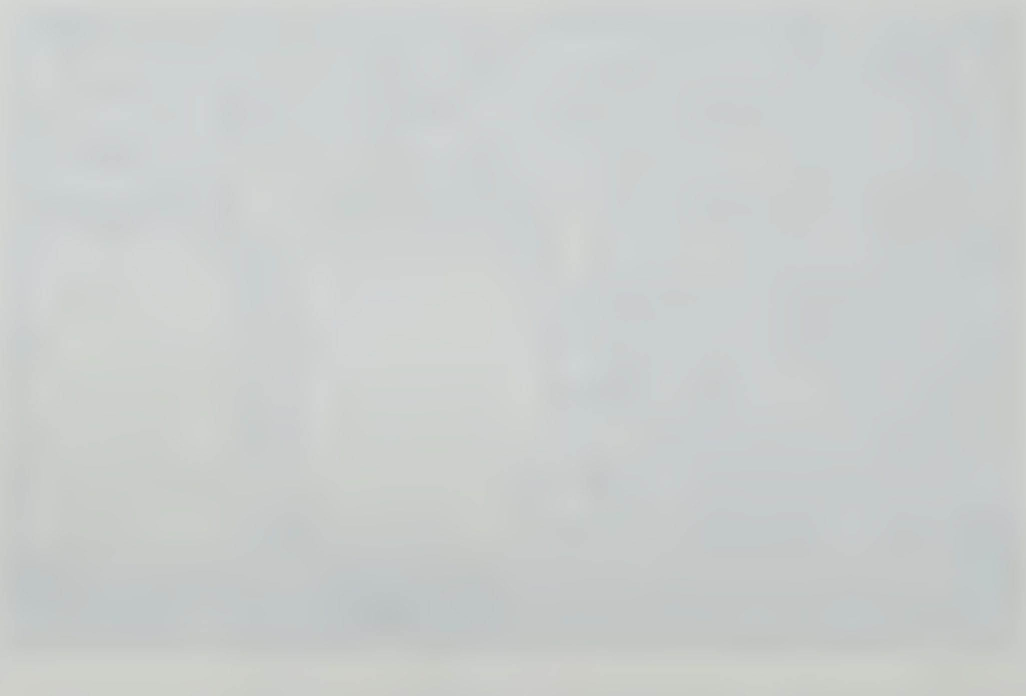
Reciprocal Tapping Apparatus

Plate 5



Easterline Angus Recorders and Hunter Interval Timers

Plate 6



given channel on two Easterbrook event recorders.

The circuit was powered by a 24 volt portable power generator; individual resistors controlled the current flow to each of the marker pens, which worked on a capillary action. The target and error plates were connected to the event recorders by individual leads from set screws at the end of each plate. An automatic switching relay allowed only one event to be recorded on the graph paper from each side of the target field, thus eliminating the possibility of the tapping stylus sliding across a number of error plates and confounding the number of hits recorded during the tapping performance.

The timing of each 15 second trial was controlled by a continuously audible 250 Hertz sine wave sound that was provided by an Eico audio generator. The sound was amplified by a Bogen Challenger amplifier. A Hunter decade interval timer provided a closed circuit to the audio generator for a set 15 second period. A second Hunter interval timer initiated by the experimenter with a push button switch, controlled an amber warning light located directly in front of the subject. This timer provided a three second warning and then automatically started the 15 second performance sound that was controlled by the other Hunter interval timer. During the warning period the subject placed the tapping stylus on the right hand target plate in readiness to commence the next trial.

In this study four dependent variables were used to measure the reciprocal tapping performance of the subjects. The first was the <u>number of hits per second</u>, which was calculated by dividing the number of hits recorded on the target and error plates during the 15 second trial by 15. The second dependent variable was the <u>number of correct</u>

hits per second. This was calculated by summing the number of hits recorded on the two target plates and dividing the result by 15. The number of errors per second was the third dependent variable, and was calculated by summing the number of hits recorded on the error plates on each side of the target plates and dividing the result by the 15 seconds of trial time. The relative accuracy was the fourth dependent variable used in this study. This was calculated by dividing the total number of correct hits per second by the seconds per hit time. The seconds per hit time was calculated by dividing the number of hits recorded on the target and error plates during a 15 second trial into 15. Relative accuracy was chosen as the primary dependent variable to evaluate the effectiveness of the training programmes on the reciprocal tapping performances of the subjects. This variable gave the best indication of performance in terms of the number of correct hits in relation to the tapping speed. The instructions specified that the subjects should hit the target as quickly as possible; therefore, it was decided that optimal performance was best measured by the above ratio which accounted for both speed and accuracy of tapping performance. It was believed that these four dependent variables would clearly indicate the effectiveness of the training programme on the reciprocal tapping speed of the subjects, and in addition would enable a comparative analysis of the speed and accuracy of the boys under training conditions.

The raw data was transformed into the above dependent variables by giving the target and error plates specific locations on each of two recorders. The number of hits recorded for every 15 second trial was scored and the total punched on a given field position, on a computer card. SPSS data transformation programmes were used to generate the

four dependent variables.

Experimental Design

The three phases of the study are illustrated in Figure 13, while Table 12 represents a diagrammatical description of the design that was used. The boys from each of the three groups were randomly assigned to one of the three training conditions: strategy, effort or control. Each of these groups was further divided into two sub-groups and exposed to failure or non-failure feedback in the post-test phase. The resulting experimental design was a 3 x 3 x 2 x 2 factorial design with repeated measures on the last factor.

Phase 1 of the design comprised the experimental induction of helplessness through the administration of five failure trials to all subjects. This was followed by a pre-test where performance scores were obtained for all subjects over eight trials, sub-divided into two blocks of four trials. Phase 2 was the training phase which exposed groups to successful experiences of coping with failure through either attribution or strategy training programmes. No training was imposed on the control group during this phase. Phase 3 was designed to assess the outcome of the helplessness and training effects of Phase 2. In this third phase, all failure groups undertook the same testing programme as in the pre-test. The non-failure groups were, however, given five practice trials, instead of the five failure trials, prior to their eight post-test trials. This technique was adopted in an attempt to accentuate the effectiveness of the training programme.

Procedure

Phase 1: The pre-test phase. Upon their arrival in the testing

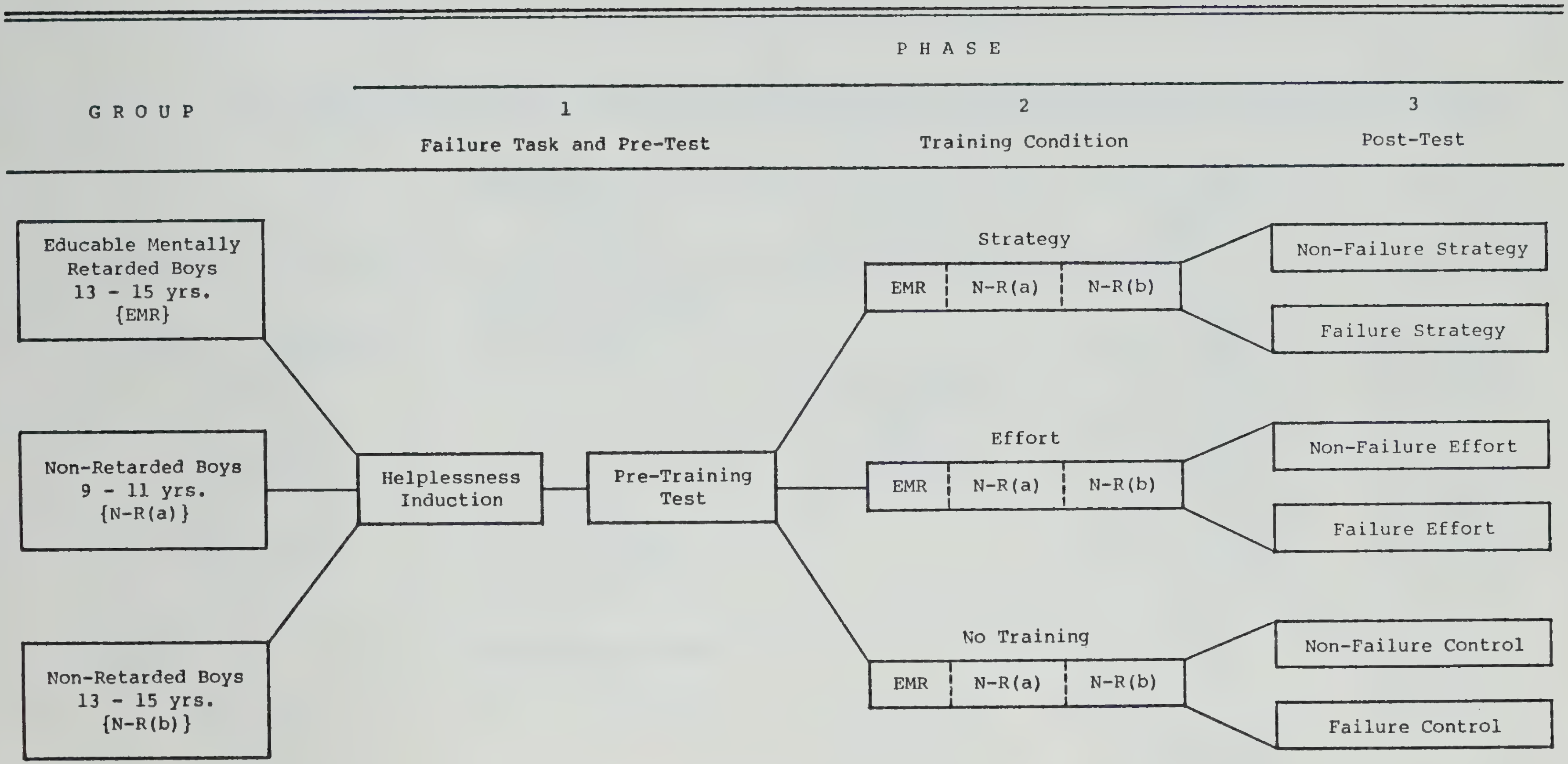


Figure 13. Schematic representation of the research design for experiment III.

Table 12

Research Design for Experiment III

<table>
<tr><th rowspan="2">SUBJECTS</th><th colspan="3">PHASE</th><th rowspan="2">GROUP</th></tr>
<tr><th><u>Pre-Test</u>
Tapping Task</th><th><u>Training</u>
Pursuit Rotor Task</th><th><u>Post-Test</u>
Tapping Task</th></tr>
<tr><td rowspan="2">Educable Mentally Retarded
13 - 15 yrs.
(EMR) N=20

Non-Retarded
9 - 11 yrs.
(N-Ra) N=20

Non-Retarded
13 - 15 yrs.
(N-Rb) N=20</td><td rowspan="2"><u>Helplessness Induction</u>
5 trials
(failure experience)

<u>Pre-Test</u>
2 x 4 trials
(1 minute intervals)
No feedback</td><td rowspan="2"><u>Strategy Training</u>
3 trials
(failure experience)
2 trials
(success experience)</td><td><u>Failure</u>
5 trials
(failure experience)
2 x 4 trials
(1 minute intervals)
No feedback</td><td>EMR (N=10)
N-Ra (N=10)
N-Rb (N=10)</td></tr>
<tr><td><u>Non-failure</u>
5 trials (practice)
2 x 4 trials
(1 minute intervals)
No feedback</td><td>EMR (N=10)
N-Ra (N=10)
N-Rb (N=10)</td></tr>
<tr><td rowspan="2">Educable Mentally Retarded
13 - 15 yrs.
(EMR) N=20

Non-Retarded
9 - 11 yrs.
(N-Ra) N=20

Non-Retarded
13 - 15 yrs.
(N-Rb) N=20</td><td rowspan="2"><u>Helplessness Induction</u>
5 trials
(failure experience)

<u>Pre-Test</u>
2 x 4 trials
(1 minute intervals)
No feedback</td><td rowspan="2"><u>Effort Training</u>
3 trials
(failure experience)
2 trials
(success experience)</td><td><u>Failure</u>
5 trials
(failure experience)
2 x 4 trials
(1 minute intervals)
No feedback</td><td>EMR (N=10)
N-Ra (N=10)
N-Rb (N=10)</td></tr>
<tr><td><u>Non-failure</u>
5 trials (practice)
2 x 4 trials
(1 minute intervals)
No feedback</td><td>EMR (N=10)
N-Ra (N=10)
N-Rb (N=10)</td></tr>
</table>

Table 12

Research Design for Experiment III

(Continued)

SUBJECTS	PHASE: Pre-Test Tapping Task	PHASE: Training Pursuit Rotor Task	PHASE: Post-Test Tapping Task	GROUP
Educable Mentally Retarded 13 - 15 yrs. (EMR) N=20 Non-Retarded 9 - 11 yrs. (N-Ra) N=20 Non-Retarded 13 - 15 yrs. (N-Rb) N=20	Helplessness Induction 5 trials (failure experience) Pre-Test 2 x 4 trials (1 minute intervals) No feedback	Control (No Training) 5 trials (practice) No feedback	Failure 5 trials (failure experience) 2 x 4 trials (1 minute intervals) No feedback	EMR (N=10) N-Ra (N=10) N-Rb (N=10)
			Non-failure 5 trials (practice) 2 x 4 trials (1 minute intervals) No feedback	EMR (N=10) N-Ra (N=10) N-Rb (N=10)

room each subject was seated on an adjustable chair in front of the testing apparatus. The subject was then read the following instructions and asked if he had any questions:

> This is a machine which measures how fast you can hit these targets. You must hit the targets one after the other like this (experimenter demonstrates). When this light goes on put the tapper on this target and get ready to tap as soon as you hear this sound (tone is pressed for the subject to hear). I want you to start tapping. Keep tapping until the sound stops.

The subject was given three practice trials and asked again if he had any questions. Following this he was prepared for the formal pre-test with the following instructions:

> Now we will see how fast you can hit these targets. I want you to try and hit them as many times as you can when you hear the buzzer. Boys your age usually get a target score of (score indicated), so I want you to try for that score. If you are successful in reaching that score the green light will flash on, if you fail this red light will flash on. (This was manipulated by the experimenter for success and failure feedback). Now remember, hit the targets as fast as you can and keep tapping until the sound stops.

Following the instructions the subject placed the wired tapper on the right hand side of the target plate when the light was illuminated. Three seconds after the warning light appeared the continuous sound was generated for a 15 second period; during this time, the subject continuously tapped, attempting to hit the two target plates. As each subject completed the pre-test programme he was given a two minute rest interval before commencing phase 2.

Phase 2: The training phase. The subject progressed to the pursuit rotor apparatus and when comfortably positioned was read the following instructions:

> This is a machine which measures how well you can move your hands and arms. Here is what you should try to do. See this spot and this pointer, when the spot begins to turn try and keep the pointer on the spot (experimenter demonstrated). Here is the score which shows how many seconds I kept the pointer on the spot. (The subject

> is shown the time on the digital clock). I would now like you to perform three practice trials for me.

The trials were carefully monitored and on completion any questions arising from the practice were answered. The subject was then prepared for the specific training trials and given the following instructions:

> I would now like you to perform five trials for me, the score boys your age usually get on this task is (score demonstrated). Place the pointer on the spot and prepare for the first trial.

The time was manipulated by the experimenter in order to simulate a failure condition on the first three trials. After each failure trial, the treatment conditions (strategy or effort retraining) were given as follows:

Strategy Training: After trial 1, "You have failed to reach the required score, we will now use a strategy to see if you can improve your performance. I want you to read this card and try and do this on your next turn." Card 1 reads: "It is important to watch the dot as it is spinning. On the next trial keep your eye on the dot at all times."

After trial 2: "That is a better score; however, you have still failed to reach the target score. Read the next card and try and do as it says on your next turn." Card 2 reads: "You will be able to keep contact with the dot if you avoid fast, jerky movements, this time keep all movements as smooth as possible."

After trial 3: "That was much better, now read the final strategy card and the first two again. On your next turn, try and carry out all three strategies." Card 3 reads: "It is important that the pointer be in contact with the turntable at all times. Therefore when you move the stylus use a smooth sliding action, don't keep lifting it off the turntable."

On the fourth and fifth trials simulated success conditions were given. Referral to the strategy concept was made by the experimenter after each trial in an attempt to reinforce the importance of the treatment. The subject was congratulated on the manner in which he carried out the strategies on the pursuit rotor task and reminded that the next testing session would be held in two days' time.

Attribution Retraining: After each of the three failure trials the subjects were told: "Your score has improved, but you have still not reached the required score. You will need to try harder. On the next trial I want you to really try, and see if you can improve your score still more."

On each of the failure trials, the experimenter manipulated the score so that each trial score was slightly higher than the preceding trial. On the fourth and fifth trials, the subject was given success experiences and reminded by the experimenter of the importance of "trying harder" and "making more effort" when failure was being experienced. Finally the subject was congratulated on his performance and reminded that the final testing session was to be held in two days' time.

Phase 3: The post-test phase. This was performed two days after the initial pre-test and training period. The post-test was a replication of the pre-test for the failure-strategy, failure-effort and failure-control groups. The non-failure groups were not subjected to any failure prior to the eight trials which determined the final performance scores. Before commencing these final trials each subject was reminded of the training programme they had undertaken on the pursuit rotor; the "attribution" groups were reminded of the importance of trying hard at each trial, while the "strategy" groups were given

a card with a strategy applicable to the tapping task after each failure trial. At the completion of the test, all subjects were thanked for their participation and told that they had performed very well on all the motor performance tasks.

Data Analysis

For the purpose of the analysis, the performance scores were summed over trials in order to gain pre and post-test means. The data was submitted to the SPSS ANOVAR programme. Four-way (group x treatment x pre/post-test x failure/non-failure) analysis of variance was performed on each of the four dependent variables: relative accuracy, total hits per second, correct hits per second, and errors per second. The results of the four dependent variables are presented in four separate sections. Tests for simple main effects were carried out where applicable in an attempt to isolate the comparisons responsible for the significant interactions. Planned contrasts were also performed to indicate significant effects where appropriate.

Results and Preliminary Discussion

The primary dependent variable was the relative accuracy of performance, which reflected the three key aspects of reciprocal tapping: the number of correct hits per second, the total hits per second, and the number of errors per second. Consideration will initially be given to the results of the four separate analyses, together with a preliminary discussion of the implications that these results have for answering the research questions. This will be followed by a more comprehensive discussion which will compare the results with previous research and

relate the outcomes to the two training programmes.

Relative Accuracy

Table 13 presents F ratios for the mean relative accuracy scores, while means and standard deviations for the scores of the three groups are presented in Table 14. The means for the groups, plotted as a function of the training procedures for the failure and non-failure post-test conditions, are shown in Figures 14, 15, and 16.

A significant four-way interaction was obtained among groups, training conditions, failure/non-failure, and pre-post conditions $F(4, 162) = 2.37$, $p < .05$. In order to identify and confirm the significant treatment effects, the data were subjected to a 2 (Treatment) x 2 (Pre-Post) analysis of variance, for both the failure and non-failure post-test conditions. Tables 15 and 16 present the F ratios for the comparison of the treatment conditions.

In the failure post-test condition, the only significant interaction that was found occurred with the educable mentally retarded group. For the comparison of the strategy and control conditions, the significant interaction of treatment and pre-post was $F(1, 18) = 16.746$, $p < .001$, and for the effort and control conditions the significant interaction obtained was $F(1, 18) = 6.379$, $p < .05$. In Figure 14, the effectiveness of the learned helplessness treatment for the educable mentally retarded group is indicated by the pre-post scores of the control group. Therefore, the significant pre-post increases in the relative accuracy scores for both the attribution and strategy treatments confirmed the effectiveness of these two programmes for the educable mentally retarded boys.

Table 13

F Ratios for Mean Relative Accuracy Scores

Source	df	MS	F	p
Group (A)	2	207.500	48.347	.001
Training (B)	2	12.511	2.915	.055
(AB)	4	5.516	1.285	.278
Failure/Non-Failure (C)	1	.713	.166	.684
(AC)	2	3.177	.740	.479
(BC)	2	.359	.084	.920
(ABC)	4	8.433	1.965	.102
Within	162	4.292		
Pre-Post (D)	1	58.643	106.369	.001
(AD)	2	1.976	3.585	.030
(BD)	2	1.970	3.574	.030
(ABD)	4	.945	1.714	.149
(CD)	1	.200	.363	.548
(ACD)	2	.221	.401	.670
(BCD)	2	.850	1.541	.217
(ABCD)	4	1.419	2.574	.040
Within	162	.551		

Table 14

Means and Standard Deviations for Pre and Post-Test Relative Accuracy Scores
Under Failure and Non-Failure Post-Test Conditions

	Strategy				Effort				Control			
	Pre		Post		Pre		Post		Pre		Post	
AGE GROUP	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
FAILURE POST-TEST CONDITION												
9-11 (NR)	3.10	.82	3.93	.63	3.37	1.11	4.24	1.21	2.94	.89	3.55	.98
13-15 (EMR)	2.57	.57	3.36	.59	2.90	.98	3.90	1.54	2.97	.84	2.92	.91
13-15 (NR)	6.28	4.11	6.68	2.41	4.86	2.43	6.16	1.31	4.70	1.46	5.77	2.53
NON-FAILURE POST-TEST CONDITION												
9-11 (NR)	3.09	1.10	4.68	1.29	2.48	.77	3.03	.83	2.84	.77	3.48	.79
13-15 (EMR)	3.08	1.12	3.62	.83	3.32	1.23	3.71	.83	3.05	1.40	3.56	1.97
13-15 (NR)	4.86	2.43	6.19	1.95	5.54	1.25	7.39	1.67	4.20	1.08	4.49	.92

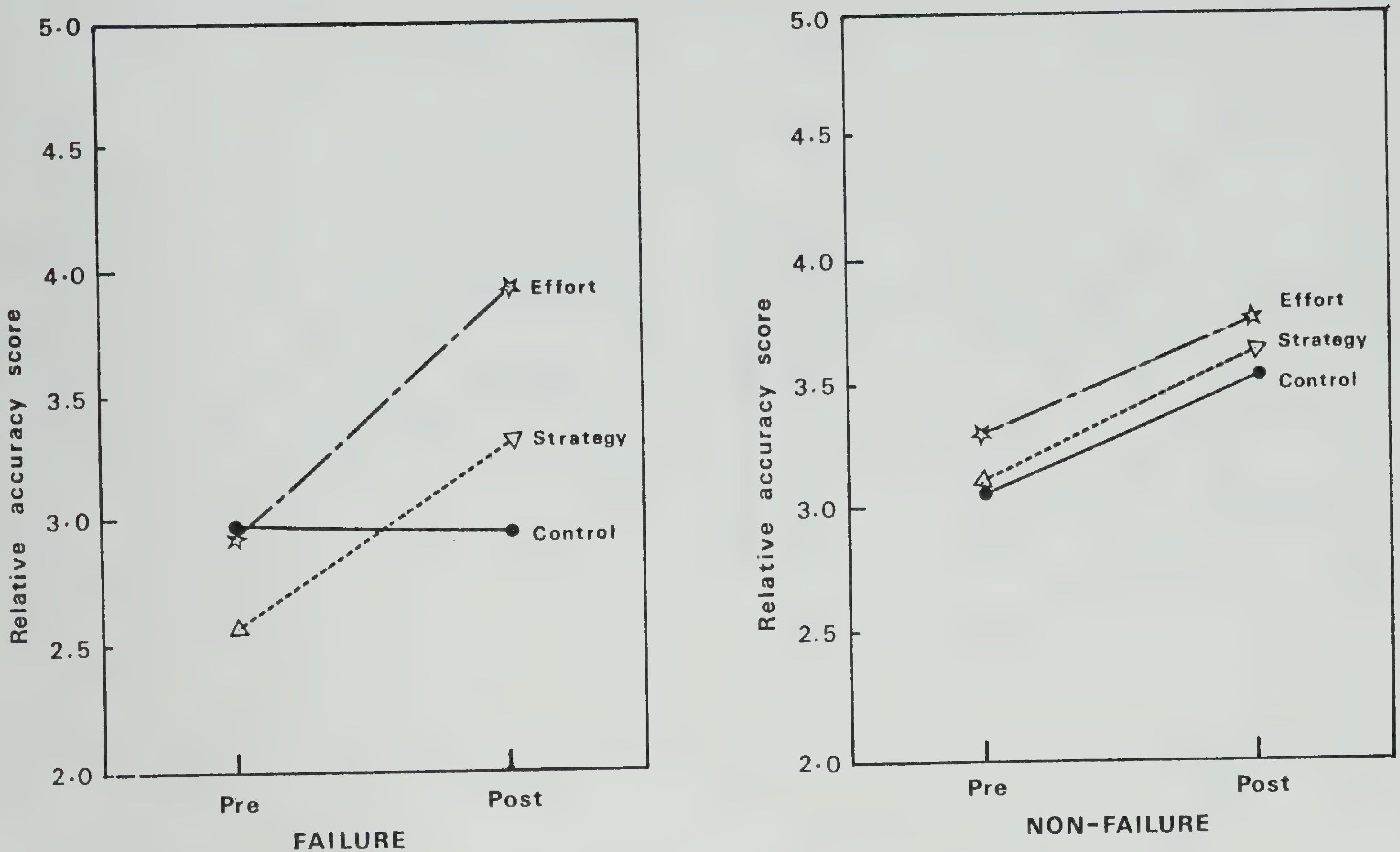


Figure 14. EMR group: Mean relative accuracy score.

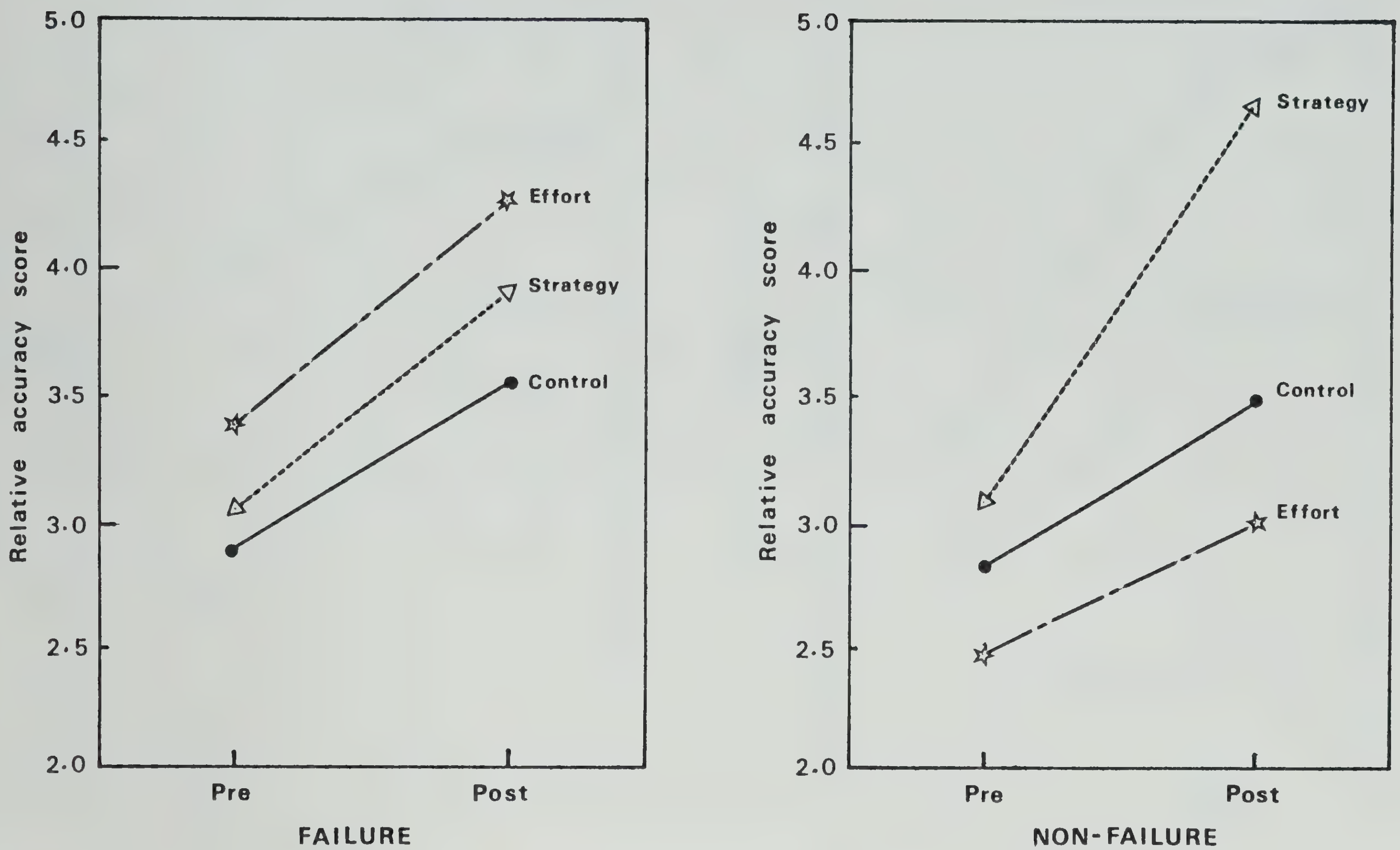


Figure 15. N-R(9-11years) group: Mean relative accuracy score.

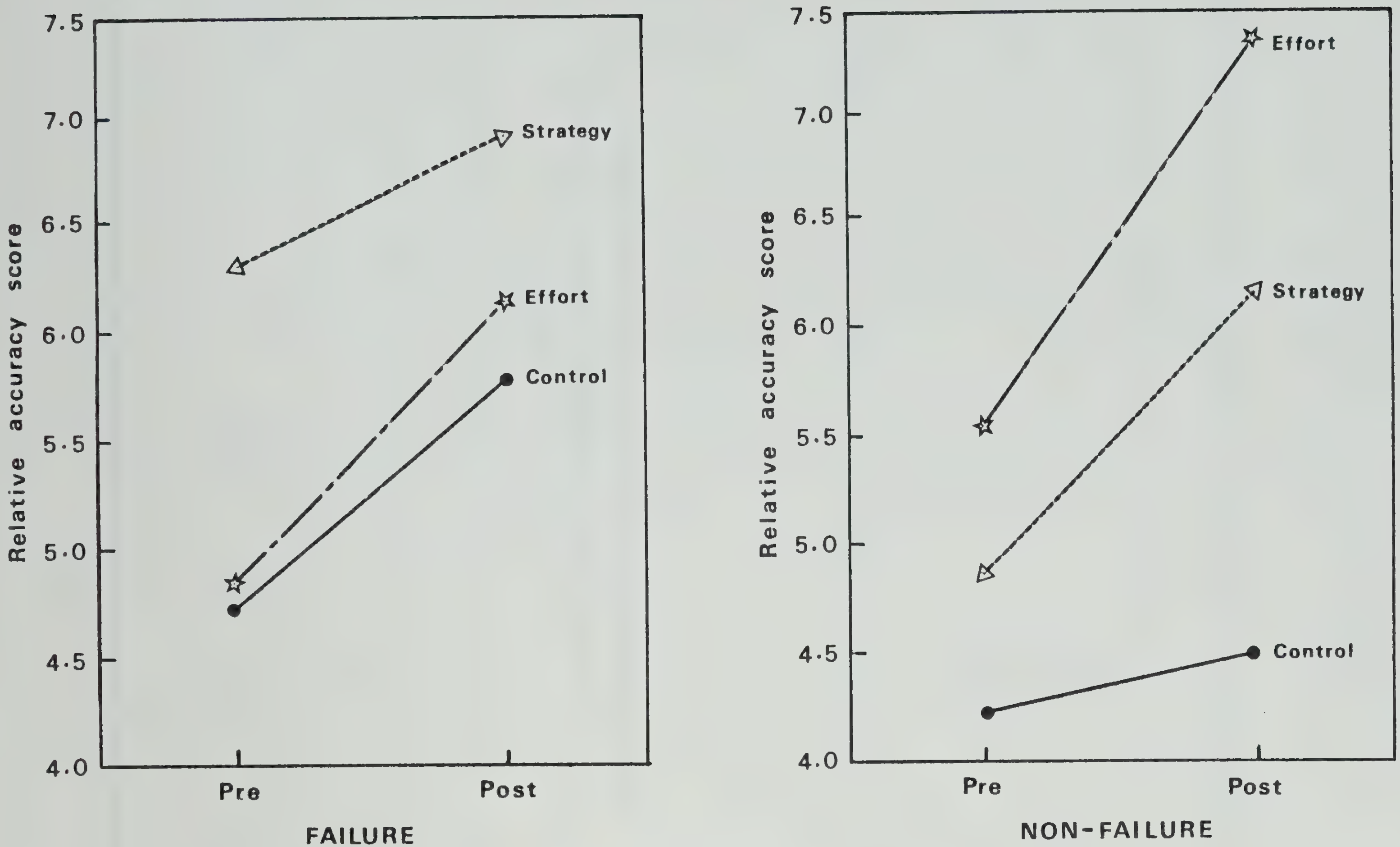


Figure 16. N-R (13-15 years) group: Mean relative accuracy score.

Table 15

F Ratios for Mean Relative Accuracy Scores of EMR Group for Strategy and Control Treatment Under Failure Post-Test Condition

Source	df	MS	F	p
Training (A)	1	.005	.005	.940
Pre-Post (B)	1	1.384	13.046	.001
AB	1	1.777	16.746	.000
Within	18	.106		

Table 16

F Ratios for Mean Relative Accuracy Scores of EMR Group for Effort and Control Treatment Under Failure Post-Test Condition

Source	df	MS	F	p
Training (A)	1	2.048	1.016	.320
Pre-Post (B)	1	2.270	5.237	.030
AB	1	2.765	6.379	.020
Within	18	.433		

As presented in Figures 15 and 16, the results of the pre and post relative accuracy scores for the control group would seem to indicate that the learned helplessness failure treatment has not been sufficiently intense to be effective for the non-retarded boys. Therefore, under the failure condition, the significant pre-post improvement in the performance scores in all three treatment conditions could only be attributed to a training or learning effect.

In the non-failure post-test condition the data for the two non-retarded groups were again submitted to a 2 (Treatment) x 2 (Pre-Post) analysis of variance with repeated measures on the last factor. Tables 17 and 18 present the F ratios of the mean scores for the younger non-retarded boys. For this group, a significant interaction of training and pre-post tests were obtained for the strategy and control groups $F(1, 18) = 5.18$, $p < .05$. The interaction for the effort and control group was, however, not significant. From this analysis, it can be concluded that the strategy training programme has been effective for the younger non-retarded group under the non-failure post-test condition.

The data for the older non-retarded group were similarly submitted to an analysis of variance programme. Tables 19 and 20 present the F ratios for the mean relative accuracy scores for this group. A significant interaction was obtained for the comparison of the strategy and control groups, treatment x pre-post $F(1, 18) = 5.06$, $p < .05$, and for the effort and control comparison, treatment x pre-post $F(1, 18) = 10.03$, $p < .01$. These results confirmed the effectiveness of the two training conditions for the older non-retarded group.

Table 17

F Ratios for Mean Relative Accuracy Scores of Non-Retarded Group (9-11) for Strategy and Control Treatments Under Non-Failure Post-Test Conditions

Source	df	MS	F	p
Training (A)	1	5.215	3.153	.090
Pre-Post (B)	1	12.416	30.632	.000
AB	1	2.262	5.582	.020
Within	18	.405		

Table 18

F Ratios for Mean Relative Accuracy Scores of Non-Retarded Group (9-11) for Effort and Control Treatments Under Non-Failure Post-Test Conditions

Source	df	MS	F	p
Training (A)	1	1.618	1.320	.260
Pre-Post (B)	1	3.492	120.312	.000
AB	1	.023	.783	.387
Within	18	.029		

Table 19

F Ratios for Mean Relative Accuracy Scores of Non-Retarded Group (13-15) for Strategy and Control Treatments Under Non-Failure Post-Test Conditions

Source	df	MS	F	p
Training (A)	1	13.920	3.230	.080
Pre-Post (B)	1	6.614	12.627	.002
AB	1	2.654	5.067	.037
Within	18	.524		

Table 20

F Ratios for Mean Relative Accuracy Scores of Non-Retarded Group (13-15) for Effort and Control Treatments Under Non-Failure Post-Test Conditions

Source	df	MS	F	p
Training (A)	1	44.967	17.302	.000
Pre-Post (B)	1	11.458	19.265	.000
AB	1	5.966	10.030	.005
Within	18	.595		

The mean scores of the three groups (Figure 17) illustrates the difference that exists in the relative accuracy tapping performance between the groups.

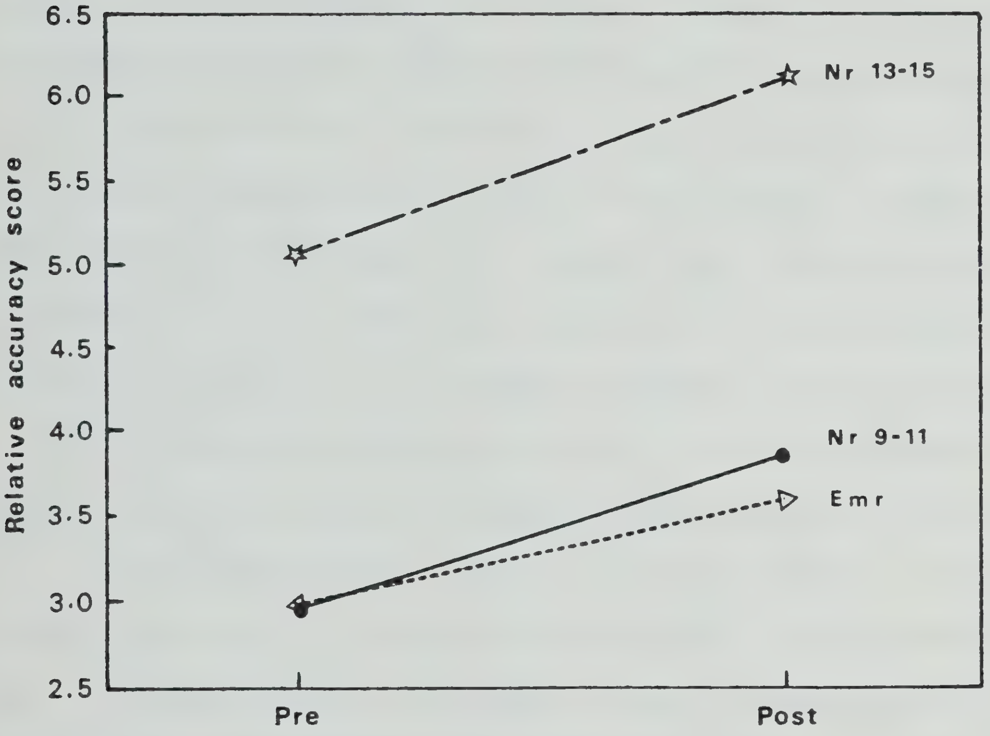


Figure 17. Mean relative accuracy score as a function of pre and post-test conditions.

Comparison of these scores indicated the overall superiority of the older non-retarded group on both pre and post-tests. Further examination indicated that there were no significant differences in the performance of the mental age matched groups.

The findings obtained from the analyses performed on the relative accuracy dependent variable were examined in the context of

the questions formulated earlier. The strategy programme has been effective in improving the performance of the retarded boys in the failure post-test condition, but has not resulted in any significant improvements for the two non-retarded groups. However, under the non-failure post-test condition, the strategy treatment has produced a significant improvement in the performances of both non-retarded groups.

The attribution retraining programme was found to be effective in improving the performance of the educable mentally retarded boys in the failure post-test condition. However, there was no apparent improvement in the performance of the two non-retarded groups that could be attributed to this training programme. On the other hand, under the non-failure post-test condition, a significant improvement in the tapping performance of the older non-retarded boys was noted.

When comparing the relative accuracy performance of the mental age matched groups, it was found that there was no significant difference in either their pre or post-test scores. However, with the chronological age matched groups, the performance of the older non-retarded boys was found to be significantly better than that of their mentally retarded counterparts.

Correct Hits Per Second

Table 21 presents the F ratios for the mean correct hits per second score. The means and standard deviations for the three groups are presented in Table 22. A significant training x pre/post interaction was obtained, $F\ (2,\ 162) = 9.866,\ p < .001$ together with a significant group x pre/post interaction, $F\ (2,\ 162) = 3.884,\ p < .05$. The mean scores of the three groups (Figure 18) illustrate the differences in the correct hit performance between the three groups.

Table 21

F Ratios for Mean Correct Hits Per Second Scores

Source	df	MS	F	p
Group (A)	2	6.063	48.733	.001
Training (B)	2	.488	3.921	.022
AB	4	.103	.826	.510
Failure/Non-Failure (C)	1	.168	1.353	.246
(AC)	2	.114	.915	.403
(BC)	2	.034	.270	.764
(ABC)	4	.141	1.131	.344
Within	162	.124		
Pre-Post (D)	1	2.426	138.117	.001
(AD)	2	.068	3.884	.023
(BD)	2	.173	9.866	.001
(ABD)	4	.025	1.423	.229
(CD)	1	.036	2.068	.152
(ACD)	2	.000	.013	.987
(BCD)	2	.022	1.269	.284
(ABCD)	4	.030	1.727	.147
Within	162	.018		

Table 22

Mean and Standard Deviations for Pre and Post-Test Correct Hits Per Second Under Failure and Non-Failure Post-Test Conditions

	Strategy				Effort				Control			
	Pre		Post		Pre		Post		Pre		Post	
AGE GROUP	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
FAILURE POST-TEST CONDITION												
9-11 (NR)	1.37	.24	1.62	.23	1.42	.20	1.60	.21	1.25	.21	1.37	.24
13-15 (EMR)	1.34	.21	1.53	.25	1.25	.23	1.39	.22	1.45	.28	1.40	.37
13-15 (NR)	1.77	.25	1.94	.40	1.76	.32	1.93	.44	1.64	.22	1.78	.33
NON-FAILURE POST-TEST CONDITION												
9-11 (NR)	1.17	.25	1.56	.25	1.25	.25	1.38	.23	1.25	.23	1.39	.19
13-15 (EMR)	1.30	.27	1.54	.22	1.46	.25	1.49	.16	1.28	.22	1.40	.37
13-15 (NR)	1.69	.32	1.92	.31	1.75	.19	2.02	.20	1.54	.22	1.65	.14

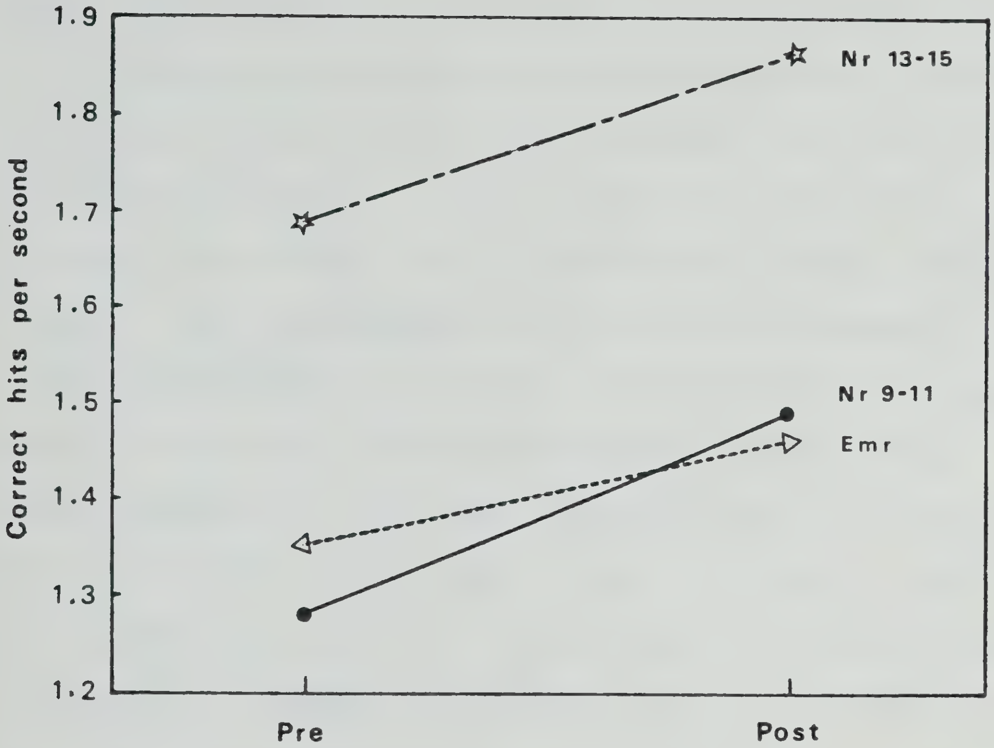


Figure 18. Mean correct hits score as a function of pre and post-test conditions.

Planned comparisons performed on these scores indicated the overall superiority of the older non-retarded group on both pre and post-tests. Further examination of these results indicated that there was no signigicant difference in the performance of the mental age matched groups. A significant training effect was observed, $F(2, 162) = 3.921$, $p < .02$. Planned contrasts indicated the following significant improvements. Under the failure post-test condition, it was again evident for the educable mentally retarded group, that the induced learned helplessness treatment was effective. This was shown by the control groups

pre and post-test scores. It was also evident that a significant interaction between the control and treatment conditions occurred, indicating the effectiveness of the attribution and strategy programme for the retarded group. For the two non-retarded groups the results followed a corresponding trend to the relative accuracy variable, as a result of the ineffectiveness of the induced helplessness treatment on the non-retarded groups, and the corresponding learning or practice effect that occurred. Planned contrasts did, however, reveal a significant improvement for the younger non-retarded boys following strategy training, $\bar{X}$ (PRE) = 1.37; $\bar{X}$ (POST) = 1.62; F (1, 162) = 4.46, $p < .05$. For the non-failure post-test conditions planned contrasts revealed significant differences in pre and post-tests under strategy training conditions for the younger non-retarded boys, $\bar{X}$ (PRE) = 1.17; $\bar{X}$ (POST) = 1.56; F (1, 162) = 10.86, $p < .01$, and the educable mentally retarded boys, $\bar{X}$ (PRE) = 1.30; $\bar{X}$ (POST) = 1.54; F (1, 162) = 4.11, $p < .05$. A significant improvement was also indicated in the older non-retarded boys' performance under attribution retraining conditions, $\bar{X}$ (PRE = 1.75, $\bar{X}$ (POST) = 2.02, F (1, 162) = 21.44, $p < .01$, and under the strategy training a corresponding improvement, $\bar{X}$ (PRE) = 1.75, $\bar{X}$ (POST) = 1.92, F (1, 162) = 15.5, $p < .01$. The mean correct hits per second for the three groups, plotted as a function of the training procedures for the failure and non-failure post-test conditions are presented in Figures 19, 20, and 21.

The following observations were made from the analysis of the correct hits dependent variable, in terms of the research questions. When the improvements in performance resulting from the strategy training programme were examined, it was noted that under the post-

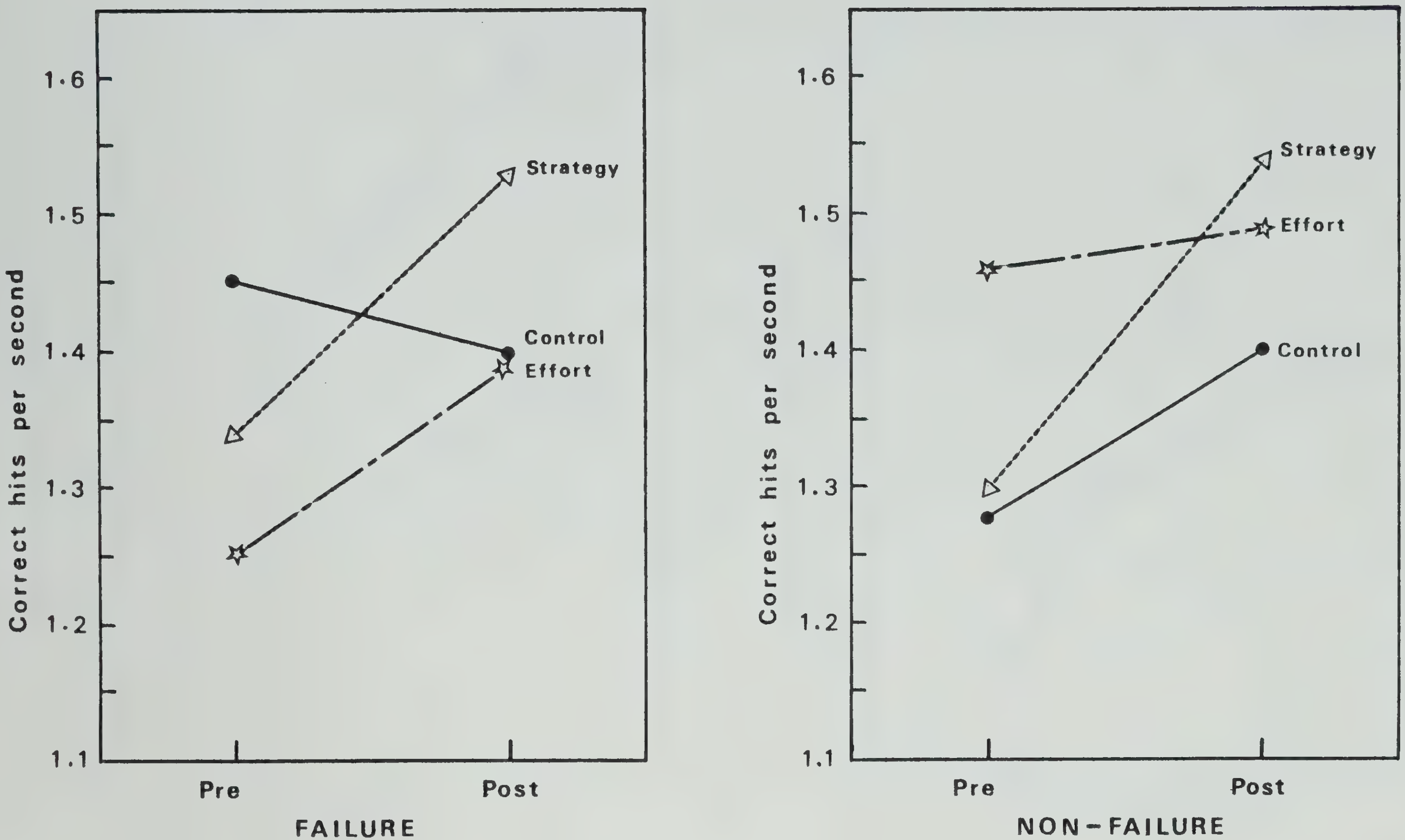


Figure 19. EMR group: Mean correct hits per second score.

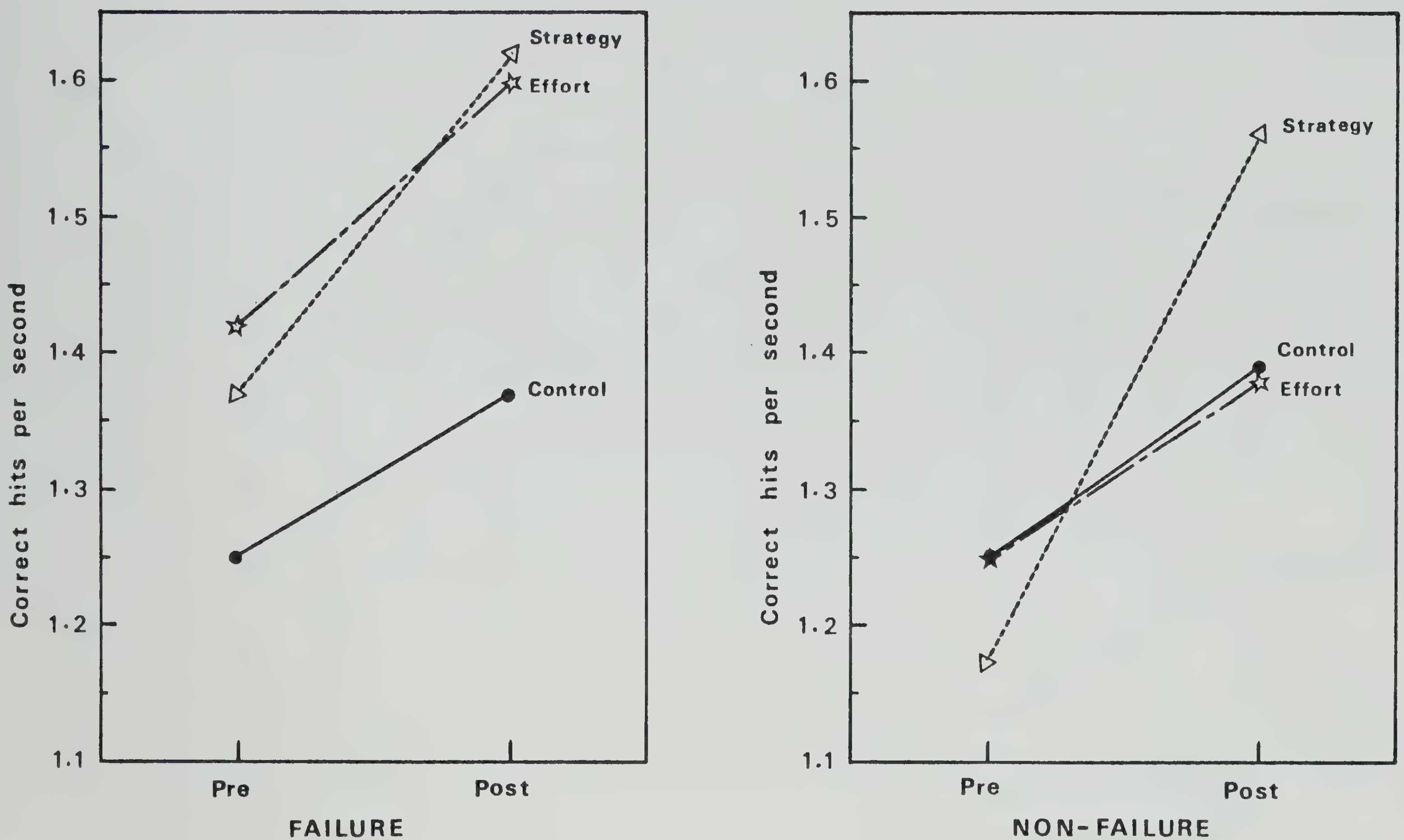


Figure 20. N-R(9-11years) group: Mean correct hits per second score.

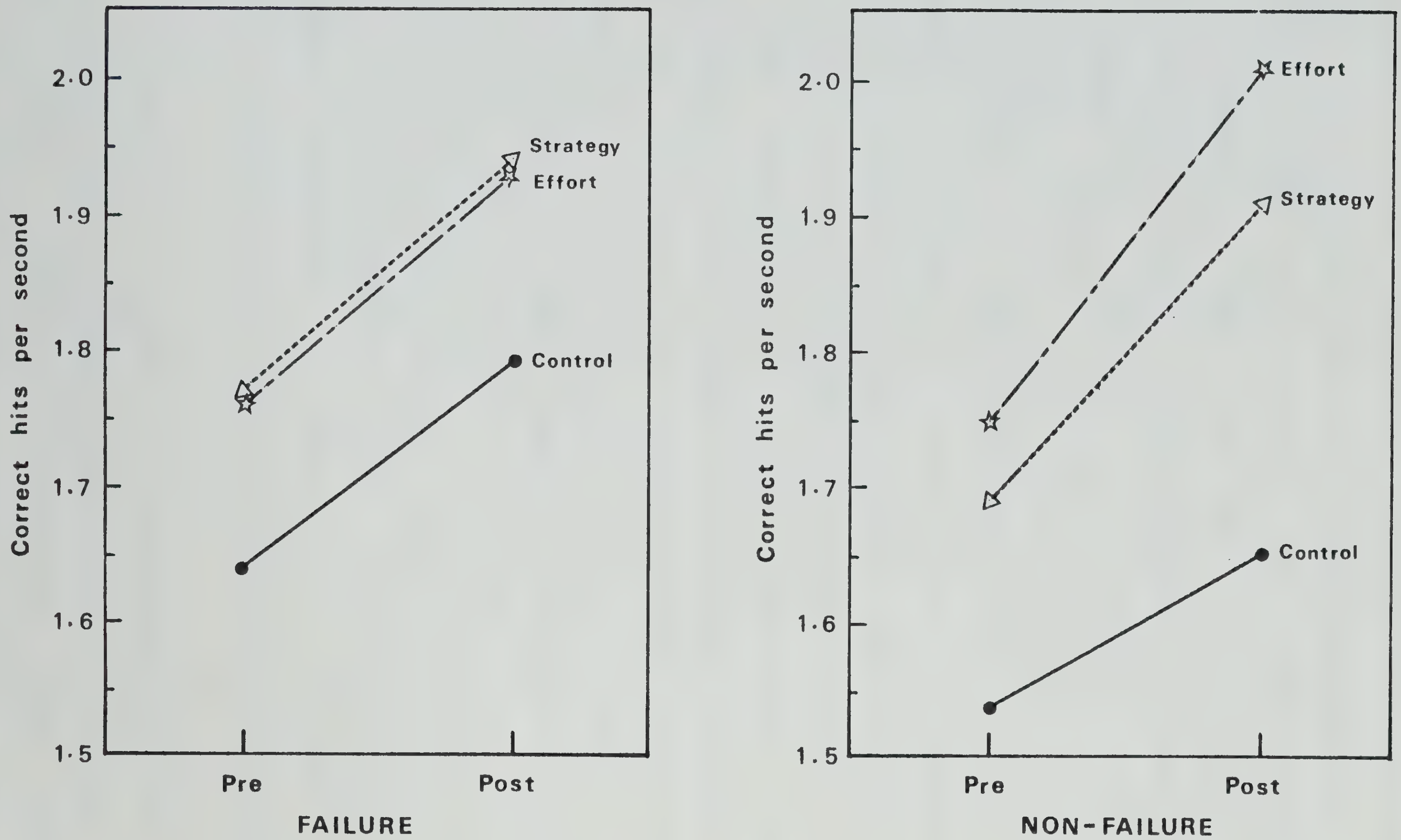


Figure 21. N-R(13–15years) group: Mean correct hits per second score.

test failure condition, that significant improvements were evident for both the educable mentally retarded and younger non-retarded groups. In the non-failure post-test condition, a similar improvement was found with the younger non-retarded group. The retarded boys showed a comparable improvement in their correct number of hits in the non-failure condition following the strategy programme. This result would seem to indicate that it is possible for the retarded boys to follow and apply strategy cues and provide evidence for the belief that this method has potential for usage with this type of group. The significant improvements noted following the attribution retraining programme were with the retarded boys in the failure post-test condition and with the older non-retarded boys in the non-failure post-test condition.

When a comparison of the training methods was made, the results indicated that the strategy training was effective in alleviating the induced helplessness (the failure post-test condition) and improving the performance with two of the groups, while the attribution retraining programme was seen to be effective under this condition with the mentally retarded group. On the other hand, in the non-failure post-test condition the strategy and attribution retraining programmes were found to be effective for the two non-retarded groups. It could therefore be said that the two programmes have given indications of being potentially beneficial for alleviating learned helplessness and improving motor performance.

A comparison of the correct hits performance of the mental age matched groups revealed no significant differences in either their pre or post-test scores. A significant difference was, however, observed when the chronological age matched groups were compared. In this

instance, the older non-retarded group was found to be significantly better than their mentally retarded counterparts.

<u>Total Hits Per Second</u>

Table 23 presents the F ratios for the mean number of total hits per second. The means and standard deviations are presented in Table 24. A grlup main effect was obtained, $F\ (2, 162) = 32.47$, $p < .001$, but there were no significant training or interaction effects. Planned contrasts performed on the pre and post-test scores for the two treatment conditions indicated no significant improvement for any of the three groups. When relating the results obtained on this dependent variable to the research questions it was evident that the two training programmes have not been effective in improving this particular area of performance, in either the failure or non-failure post-test conditions.

A comparison of the mean scores for the total hits per second collapsed over training conditions and pre and post-tests indicated only very small differences between the mental-age matched groups. However, with the chronological age matched groups, the performance of the older non-retarded boys was significantly better than their mentally retarded counterparts, $\bar{X}$ (NR 13-15) = 3.05; $\bar{X}$ (NR 9-11) = 2.41; $\bar{X}$ (EMR 13-15) = 2.28.

Although, in this study the instructions of the two training conditions were specifically designed to increase the reciprocal tapping speed, and provided strategies to assist with this performance, the results indicated that this did not occur. It would appear that the subjects have been mindful of the need to strike the targets and were

Table 23

F Ratios for the Mean Total Hits Per Second Scores

Source	df	MS	F	p
Group (A)	2	19.893	32.479	.001
Training (B)	2	.856	1.397	.250
(AB)	4	1.030	1.681	.157
Failure/Non-Failure (C)	1	.120	.197	.658
(AC)	2	.310	.505	.604
(BC)	2	.176	.287	.751
(ABC)	4	2.617	4.273	.003
Within	162	.612		
Pre-Post (D)	1	5.136	49.448	.001
(AD)	2	.065	.629	.534
(BD)	2	.266	2.558	.081
(ABD)	4	.072	.692	.599
(CD)	1	.009	.082	.775
(ACD)	2	.071	.682	.507
(BCD)	2	.066	.635	.531
(ABCD)	2	.221	2.130	.079
Within	162	.104		

Table 24

Means and Standard Deviations for Pre and Post-Test Total Hits Per Second Scores Under Failure and Non-Failure Post-Test Conditions

AGE GROUP	Strategy				Effort				Control			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
FAILURE POST-TEST CONDITION												
9-11 (NR)	2.24	.41	2.42	.31	2.32	.55	2.68	.35	2.23	.42	2.58	.42
13-15 (EMR)	1.90	.20	2.20	.29	2.33	.69	2.75	.84	2.01	.32	2.04	.30
13-15 (NR)	3.35	1.22	3.36	.69	2.63	.82	3.04	.81	2.81	.55	3.17	.65
NON-FAILURE POST-TEST CONDITION												
9-11 (NR)	2.59	.56	2.98	.63	1.97	.63	2.19	.47	2.24	.31	2.47	.28
13-15 (EM$)	2.35	.72	2.33	.42	2.22	.53	2.48	.44	2.32	.55	2.44	.80
13-15 (NR)	2.80	.68	3.18	.59	3.17	.82	3.64	.62	2.69	.47	2.69	.35

conscious of the error factor increasing as the tapping speed increased.

Errors Per Second

Table 25 presents the F ratios for the mean error per second scores. The means and standard deviations for the three groups are reported in Table 26. A main effect for group was observed, $F (2, 162) = 8.809$, $p < .001$; however, there was no significant training or interaction effects. The analysis of the results of the dependent variable, errors per second, has indicated that neither of the two treatments significantly affected this variable. When the means for the total errors per second were collapsed over training conditions and pre and post-test, the results indicated that the older non-retarded group had the largest number of errors when compared to the other two groups, $\bar{X}$ (NR 13-15) = 1.26; $\bar{X}$ (NR 9-11) = 1.02; $\bar{X}$ (EMR 13-15) = .879. While the older non-retarded group was found to have largest number of errors, because of their faster reciprocal tapping performance they achieved a greater proportion of correct hits. As a result of this, their performance as indicated by the relative accuracy variable was superior to the other two groups.

Discussion

The discussion of this experiment comprises two sections. The first integrates the results of the four dependent variables, and compares the results with previous research performed in this area. The second section relates the results to the two training programmes that have been incorporated in the experiment.

Table 25

F Ratios for Mean Errors Per Second Scores

Source	df	MS	F	p
Group (A)	2	4.437	8.809	.001
Training (B)	2	.061	.122	.885
(AB)	4	.961	1.907	.112
Failure/Non-Failure (C)	1	.573	1.138	.288
(AC)	2	.120	.237	.789
(BC)	2	.277	.550	.578
(ABC)	4	.648	5.256	.001
Within	162	.504		
Pre-Post (D)	1	.502	4.977	.027
(AD)	2	.008	.079	.924
(BD)	2	.403	3.987	.020
(ABD)	4	.043	.430	.787
(CD)	1	.080	.796	.373
(ACD)	2	.066	.657	.520
(BCD)	2	.052	.512	.600
(ABCD)	4	.160	1.583	.181
Within	162	.101		

Table 26

Means and Standard Deviations for Pre and Post-Test Errors Per Second Scores Under Failure and Non-Failure Post-Test Conditions

	FAILURE POST-TEST CONDITION											
	Strategy				Effort				Control			
	Pre		Post		Pre		Post		Pre		Post	
AGE GROUP	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
9-11 (NR)	.87	.39	.80	.37	.90	.48	1.00	.25	1.08	.23	1.21	.44
13-15 (EMR)	.55	.22	.53	.22	1.07	.79	1.35	.79	.56	.32	.64	.25
13-15 (NR)	1.58	.99	1.41	.69	.86	.56	1.10	.56	1.62	.59	1.39	.71
	NON-FAILURE POST-TEST CONDITION											
9-11 (NR)	1.41	.54	1.41	.64	.72	.33	.81	.25	.99	.46	1.08	.46
13-15 (EMR)	1.05	.77	.78	.40	.76	.46	.99	.46	1.03	.27	1.03	.27
13-15 (NR)	1.10	.56	1.25	.54	1.42	.61	1.62	.59	1.15	.44	1.03	.85

In a previous study on the reciprocal tapping performances of mental-age matched non-retarded and retarded boys, Wall (1978) found that the non-retarded boys demonstrated better reciprocal tapping performance in relation to their mentally retarded counterparts (when following instructions for speed rather than accuracy). The results obtained in this experiment did not support these findings. A comparison of the mental-age matched groups pre and post-test scores indicated no significant difference in the relative accuracy score on the reciprocal tapping task. It is evident that although the mentally retarded boys had a definite advantage in terms of physiological maturation, other factors have contributed to performance outcomes that were comparable to the younger non-retarded groups. The factors which should be taken into consideration are: the possibility of a two to three year lag in cognitive development, and the lower level of self-confidence resulting from frequent exposure to failure experiences (Zigler, 1971).

When pre and post-test scores were examined, it was found that the older non-retarded group that was matched on chronological age performed significantly better than the mentally retarded boys. This was evident from the results obtained on the primary dependent variable, i.e., relative accuracy, and the supplementary measures of total hits per second, correct hits per second and errors per second. Although the older non-retarded boys committed more errors than their mentally retarded counterparts, their faster mean movement time significantly raised the relative accuracy score. These findings correspond with recent comparative studies researching fine motor performance on

a variety of tasks by Knight, Atkinson and Hyman, 1967; Gorden, 1969; Weaver and Ravaris, 1972; Simenson, 1973, and Lally and Nettlebeck, 1977.

The results of this study have indicated that for the primary dependent variable, relative accuracy, the training programmes were effective in improving the performance of the educable mentally retarded group in the failure post-test condition, while it was apparent that the improvement for the two non-retarded groups was attributable to a practice effect. Significant improvements have also been observed in the non-failure post-test conditions. Specifically, strategy training proved to be effective for both non-retarded groups, with significant improvements occurring in their level of relative accuracy scores. Again, under the non-failure post-test condition, the older non-retarded group showed a marked improvement in performance as a result of the attribution retraining programme.

A significant finding emerging from these results was the effectiveness of the inducement of learned helplessness and the comparative alleviation of this condition. It was especially important to note that the learned helplessness treatment did not appear to be effective for the two non-retarded groups, a finding which corresponds to the results of experiment II where it was noted that non-retarded boys attributed their failure outcomes to an unstable controllable factor, lack of effort, while the educable mentally retarded boys attributed failure to a stable uncontrollable factor, lack of ability. This outcome also supports the notion that educable mentally retarded boys are particularly susceptible to helplessness when faced with failure conditions (Weisz, 1979).

Another factor emerging from these findings was the response

to instructions by the groups. When considering the ratio of correct hits per second to errors per second the retarded boys have demonstrated a superior performance to the other two groups. This result was gained by maintaining a much slower mean movement time. However, as the instructions required the subjects to tap with as much speed as possible, the ratio of correct hits to mean movement time (i.e. relative accuracy) provided a more precise indication of performance. The individual response of the subjects to instructions is a factor over which the experimenter has little control. Standardized instructions were given to the three contrasting groups. However, from the results of this experiment, it is not possible to identify whether the differences in the performances of the younger non-retarded and mentally retarded groups, when compared to the older non-retarded groups, resulted from physiological and mental processes contributing to skill performance or, from a failure of the groups to respond consistently to the training instructions.

With tasks demanding speed and accuracy there is the possibility that the subjects undertaking the task will not sacrifice accuracy for speed irrespective of the particular instructions that are given. It is apparent that the educable mentally retarded boys and the younger non-retarded boys were so conscious of the emphasis placed on hitting the targets, that any attempts to work at a faster rate were negated. It has been demonstrated that the mentally retarded exhibit deficits in the time required to make simple response movements (Lally and Nettlebeck, 1977) and it would appear that the younger non-retarded boys either lacked the motor coordination and/or the self-confidence to work at a faster rate after the training sessions.

In summary, by comparing the two training programmes, this experiment has shown that both have been effective in specific instances, and their potential for improving motor performance has been confirmed.

Chapter VII

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary of the Study

The three main areas of concern in this study were formulated into a sequence of experiments, with the direction and design of each being determined according to the results of the preceding experiment. The first purpose of the study was to assess the influence of the locus of control construct, a personality variable, as a determining factor in the motor performance of educable mentally retarded boys. The experiment was specifically concerned with the differential response of internal and external locus of control subjects to success and failure situations. With the outcome indicating that the internal/external control variable was not significant, the second experiment was designed utilizing the attributional model of achievement motivation. The purpose was to establish whether the model could be effectively applied in understanding the causal perceptions and behaviours of both non-retarded and educable mentally retarded boys under conditions of simulated success and failure. The ability of the selected groups to make differential causal ascriptions was confirmed, and the third experiment subsequently applied the attributional model to retraining programmes. Using a fine motor performance task, the purpose was to test the effectiveness of these programmes which were

designed to alleviate learned helplessness by providing successful experiences in coping with failure.

Conclusions

Because past research has not been concerned with the application of attribution theory in the reversing of learned helplessness in the specific area of motor performance of educable mentally retarded boys, the conclusions are restricted to the particular mental and chronological age groups of the selected subjects. The conclusions are presented in the form of answers to research questions which were formulated when the direction of the study was established.

1. Do success and failure experiences differentially influence the motor performance of educable mentally retarded boys classified as internally or externally controlled on the locus of control scale?

The success and failure treatment was applied in order to determine the differential reaction of the two locus of control groups to the treatment programme. Under the experimental conditions the predicted variation in the response of the two groups did not eventuate. It was hypothesized that the performance of the internal locus of control group would not be significantly affected by either success or failure outcomes. Examination of the pre and post-test scores revealed the anticipated outcome. The slight improvement noted in Figure 9 for the ILC success and control groups may possibly be attributed to a practice or learning effect taking place. In the case of the external locus of control group it was predicted that the two treatment conditions would significantly influence the post-test motor performance of the group. However, while a significant improvement occurred following the success

treatment, no significant change resulted from the failure treatment. In addition a marginally significant improvement occurred with the control group. In view of these findings it was concluded that the locus of control construct is not a determining factor that influences the response made by these groups to success and failure.

Numerous reasons can be submitted in attempting to explain the ineffectiveness of the treatment conditions. These include such factors as, the type of task used, the limited skill level and potential of the subjects involved, the methods by which success and failure were induced and the intensity of the treatment feedback. Irrespective of whether this outcome resulted from a single element or a combination of these factors, the results did not indicate that the internal/external classification sufficiently differentiates between the response of the subjects to justify its inclusion as a variable by which to categorize subjects. As the subsequent experiments were designed as comparative studies of educable mentally retarded and non-retarded boys, it was decided not to use the locus of control variable as a blocking factor, but instead to follow a chronological and mental age matched design as recommended by Denny (1964).

2. Do educable mentally retarded boys make causal ascriptions as a function of success and failure feedback in a similar manner to non-retarded boys matched on mental age?

(a) Attributions for successful outcomes

The educable mentally retarded boys, responding as low achievers, attributed success to the causal factors of effort and good luck. This result correlates closely with findings by Weiner *et al.* (1971) and Kukla (1972) in their comparative studies of high and low achieving groups. There is, however, disparity between these findings and those

of Horai and Guarnaccia (1975), who in an initial attributional study using trainable mentally retarded adults, reported that these subjects interpreted success in ways that are generally consistent with high rather than low achievers. The ascribing of success to effort by the educable mentally retarded group may reflect classroom reinforcement methods and parental influences, where frequent referral has been made to the importance of "effort" in achieving success. Correspondingly, their lack of personal esteem and self-confidence is reflected in the prominence given to the causal factor luck.

Effort was also perceived by the younger non-retarded group (9-11 years), as the major criterion for success, while ability was seen as the supportive factor. Task difficulty and luck were viewed as being of little importance. This result is consistent with ascriptions made by high achievers, and by comparison with the retarded group indicates they were able to identify ability as a contributing factor in performance and realize that effort alone is not always sufficient for successful outcomes.

(b) Attributions for failure outcomes

As typically low achievers, the educable mentally retarded boys would have been frequently exposed to failure. Under the simulated conditions of the experiment, this group consistently gave lack of ability as the major reason for failing, with task difficulty as a supportive factor. The frequency of these responses, together with the characteristic defensive or self-enhancing behaviour of attributing failure to an external factor (task difficulty), would seem to indicate an acute awareness of their personal limitations.

The younger non-retarded group attributed their failures

initially to the difficulty of the task while perceiving ability as being a supportive factor. Nicholls (1979) has also noted the tendency for subjects in this age group to attribute failure to task difficulty.

In summary, it can be concluded that in comparing the conditions of success and failure significant differences between the attributions made by the mental age matched groups do exist.

3. Do educable mentally retarded boys make causal ascriptions as a function of success and failure in a manner that is similar to non-retarded boys of the same chronological age?

(a) Attributions of the non-retarded group (13-15 years) for success and failure

The older non-retarded group have attributed success to a high level of ability and to the effort made in achieving the outcome. This result corresponds to research findings by Weiner *et al.* (1971) and Kukla (1972), who have reported that high achievers typically accept responsibility for outcome, and thus are more inclined to attribute it to personal as opposed to environmental factors.

Under the failure conditions of the experiment, this group attributed a lack of effort as the major reason for failure, with the difficulty of the task as a secondary factor. Bad luck and lack of ability were not inferred as being important determinants of failure.

(b) Comparison of the chronological age matched groups

In contrasing these two groups, a pattern of behavioural differences under conditions of failure has been seen to emerge. The educable mentally retarded subjects have attributed failure to lack of ability. This has a debilitating effect which leads to anticipating failure in the future, and results in performance being impeded. The non-retarded group, on the other hand, perceived failure as being

caused by insufficient effort, an internal unstable factor. This permits the subject to believe that success can be achieved provided effort is increased or redirected.

Although matched on chronological age the groups have indicated contrasting causal attributes for success and failure outcomes, attributes characteristic of normal and low achieving individuals. It is apparent that the subjects' self-concept of their own ability significantly influences their causal attributions for performance. This attitude is also reflected in the differing attributions made for success outcomes. Here the non-retarded group has ascribed success to the internal factors of ability and effort, while the retarded subjects have indicated luck and effort as being important.

It is difficult for a comparison of these results to be made with earlier studies, as previous research has been concerned with either non-retarded children (Nicholls, 1978, 1979) or retarded adults (Horai and Guarnaccia, 1975). At this point in time, there does not appear to be any research evidence of an attributional study being performed with a comparative sample of non-retarded and educable mentally retarded children.

4. Does the motor performance of educable mentally retarded and non-retarded boys, matched on mental and chronological age, improve significantly following either attribution retraining or a strategy training programme designed to alleviate learned helplessness?

The experiment initiated in order to answer this question was designed to determine whether it was possible to teach children to overcome repeated failure by the application of either an attribution retraining or a strategy based programme. The contrasting groups chosen for this experiment provided an ideal opportunity for compara-

tively assessing the effectiveness of the programmes over a wide spectrum of ability.

(a) Attribution retraining programme

Under the failure post-test conditions, the analysis performed has indicated that the attribution retraining programme has produced significant improvement in the performance of the educable mentally retarded groups on both the relative accuracy and the correct hits dependent variables. In the non-failure post-test conditions, the attribution retraining was found to be effective in improving the relative accuracy of the older non-retarded group. This improvement has resulted from an increase in the number of correct hits scored on the two target plates.

(b) Strategy training

In the failure post-test condition, the strategy training programme has been found to be effective in significantly improving the performance of the educable mentally retarded boys and the younger non-retarded boys on both the relative accuracy and correct hits dependent variable. In the non-failure condition, the relative accuracy was found to improve for both of the non-retarded groups. A corresponding improvement was also noted in all three groups for the dependent variable, correct hits per second.

Comparison of the Training Methods

It is evident from these results that the goal of teaching boys to overcome failure has been successful, specifically with the educable mentally retarded group. The initial task of inducing a feeling of helplessness by exposing the subjects to a number of failure trials,

needs to be reconsidered. It was demonstrated from the control groups' pre and post-test scores that although the method utilized in this experiment was successful with the retarded boys, more intense failure experiences would need to be given if a condition of learned helplessness is to be satisfactorily induced when using non-retarded groups.

The fact that the training programmes have been particularly successful in improving performances under the non-failure post-test condition and effective for the educable mentally retarded group in the failure post-test condition, supports the selection and improvization of these methods for future research in the area of learned helplessness. It is suggested that for studies involving contrasting groups such as those used in this study, it is necessary to include various levels in the intensity of the induced helplessness, and levels in the duration and intensity of the training programmes.

The question of whether or not motivational training can be effective with retarded subjects may be confirmed by a replication of the study, with the suggested modifications.

Research performed by Cullen (1979) clearly indicated that children who are frequently experiencing difficulties require implicit assistance in the development and utilization of strategies. This is an area that appears to contain benefits and potential that can be exploited with further experimental research.

Applications of the Findings

This study has endeavoured to apply the psychological phenomenon of attribution theory and learned helplessness to the area of motor

performance. The design of the study restricts the generalizability of the findings to comparable groups in the age and IQ range chosen for the series of experiments. A second limitation arises from the restriction of the data to experimental conditions and the absence of naturalistic observations.

The study has provided evidence to indicate that the attributional model of achievement motivation can be used with both non-retarded and retarded children. The implications for teaching and learning are of crucial importance, and involve adapting instructions and tasks to meet particular needs. The variability of these needs is indicated by the diversity of the causal attributes made by the high and low achieving groups during success and failure experiences. Not only is it essential for teachers to accommodate the differing levels of ability in order to enable all students to achieve success, but additionally, these results indicate the importance of providing success experiences which can be attributed to effort, rather than to ability, luck or task difficulty.

Of equal importance is the manner in which teachers handle failure. Particularly in the case of helpless students, this can be instrumental in determining the level of self-confidence and how well the individual copes with the situation. Students must be taught that the ability to cope with failure requires the acceptance of responsibility for failure, and understand that making errors is an important part of learning. This study has endeavoured to explore the potential of two methods of assisting individuals in coping with the failure situation, specifically at motor tasks. From the results of this study, several implications for future research are suggested.

Since spontaneous verbalizations are indicative of helplessness and mastery-orientated behaviour (Diener and Dweck, 1978), the collection of such data while the individual is coping with a failure task would contribute to a more complete understanding of how subjects perceive the achievement task. Observations in a naturalistic setting would also allow the recording of uninhibited attributions made for a diversity of outcomes. Analysis of those gestures, remarks and comments would provide teachers with an insight into children's cognitions of achievement-related situations.

A second direction for research lies in increasing the effectiveness of the training procedures employed in this study. Improvement in the motor performance of the respective groups could be facilitated by reducing the number of subjects, and increasing the time spent with each individual under experimental conditions. This method adopted by Dweck (1975) resulted in significant performance improvement.

A final recommendation for future research centres on a comparative study that tests the reciprocal tapping performances of non-retarded and retarded boys using instructions for speed and involving strategy and effort attribution retraining conditions. This would be a replication of experiment III; however, on this occasion, particular attention given to the techniques involved, by video-taping performance for future qualitative analysis. Structured interviews would also enable a greater understanding of the cognitive processes by providing valuable information as to how subjects perceive, interpret and respond to the instructions of the experimental situation.

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APPENDIX

Bialer-Cromwell Children's Locus of Control Scale

BIALER-CROMWELL CHILDREN'S LOCUS OF CONTROL SCALE

This is not a test. I am just trying to find out how kids your age think about certain things. I am going to ask you some questions to see how you feel about these things. There is no right or wrong answer to these questions. Some kids say 'no' and some say 'yes'. When I ask the question, if you think the answer should be 'no' or mostly 'no', say 'no'. Remember different children give different answers, and there is no right or wrong answer. Just say 'yes' or 'no' depending on how you feel the question should be answered. If you want me to repeat a question, ask me. Do you understand? All right, listen carefully, and answer 'yes' or 'no'.

(.31)* 1p. When somebody is mad at you, do you usually feel there is nothing you can do about it?

(.55) 2f. Do you really believe a kid can be whatever he wants to be?

(.34) 3f. When people are mean to you, could it be because you did something to make them mean?

(.23) 4f. Do you usually make up your mind about something without asking someone first?

(.26) 5f. Can you do anything about what is going to happen tomorrow?

(.41) 6f. When people are good to you, is it because you did something to make them be good?

(.38) 7f. Can you ever make other people do what you want them to do?

(.46) 8f. Do you think kids your age can change things that are happening in the world?

(.55) 9f. If another kid is going to hit you, is there anything that you can do about it?

(.53) 10f. Can a child your age ever have his own way?

(.23) 11p. Is it hard for you to know why certain people do certain things?

(.37) 12f. When someone is nice to you, is it because you did something nice to them?

(.64) 13f. Can you ever try to be friends with another kid even if he doesn't want to be?

(.37) 14f. Does it ever help any to think about what you will be when you grow up?

(.34) 15f. When someone gets mad at you, can you usually do something to make him your friend again?

(.37) 16f. Can kids your age ever have anything to say about where they are going to live?

(.37) 17f. When you get into an argument, is it sometimes your own fault?

(.62) 18p. When nice things happen to you, is it only good luck?

(.31) 19p. Do you often feel you get punished when you don't deserve it?

(.37) 20f. Will people usually do things for you if you ask them?

(.35) 21f. Do you usually feel that a kid can be whatever he wants to be when he grows up?

(.33) 22p. When a bad thing happens to you, is it usually someone else's fault?

(.42) 23f. Can you ever know for sure why certain people do certain things?

* These figures in parentheses represent the item total score point biserial correlation coefficients, attained during the standardization for Bialer's dissertation (Bialer, 1960).

The letter "f" following an item indicates that an answer of 'yes' is scored as internal control.

The letter "p" signifies that an answer of 'no' is scored as internal control.